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THESIS

WEB-ENABLED DOCTRINE: THE EVOLUTION OF A DYNAMIC DOCTRINE DEVELOPMENT PROCESS IN THE U.S. NAVY

by

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The Navy envisions dynamic development process for doctrine that produces accessible, timely, and relevant doctrine for the Fleet. The Navy Warfare Development Command (NWDC) in Newport, RI, recently has implemented information technology tools in the doctrine development process, creating the concept of Web-Enabled Doctrine. This thesis analyzes Web-Enabled Doctrine as the next step forward in the evolution of a dynamic doctrine process. This thesis presents an historical study of doctrine in the U.S. Navy, a description of the Navy's doctrine development process over the past three decades, and an evalution of the current system with respect to the characteristics of a dynamic process. Data on the current process and Web initiatives were gathered through interviews with current and former NWDC staff members. The results indicate that NWDC has increased the level of responsiveness in the process, thus improving the relevance and timeliness of doctrine. Recommendations are made for increased accessibility to the system and the migration towards emerging commercial Web standards (XML).

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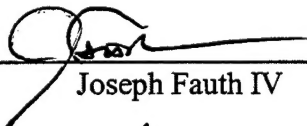Lieutenant, United States Navy
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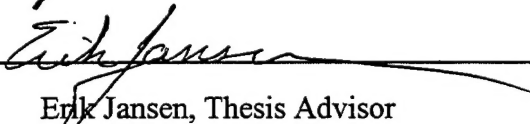
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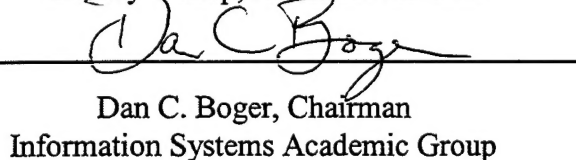
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I. INTRODUCTION

It has been proved again and again that nothing is more fatal than 'waiting for orders'. – Rear Admiral David Beatty, Commander of Admiral Sir John Jellicoe's Battle Cruiser Fleet, days before the Battle of Jutland [Ref. 1:p. 137].

A.   PURPOSE

RADM Beatty's quote, though uttered in 1916, has never been more true than in today's high-volume, high-speed, information-packed battle space. The speed at which current technology allows data to be collected and disseminated has compressed the modern naval commander's decision cycle such that any hesitation in that cycle can be disastrous. A commander's efforts in this cycle should be focused on the evaluation and analysis of the data he or she receives, not on what to do with the information once it has been processed.   Once the commander obtains situational awareness, the proper application of tactics to that situation should be evident immediately. An officer versed in well-developed, relevant doctrine will have such an instinctive response to tactical situations. The key ingredient in this recipe for battle space success is doctrine.

Without doctrine, commanders are forced to add the time-consuming, intellectually intensive step of synthesizing a proper course of action given an existing tactical situation. The average naval officer may possess the capacity for original strategic or tactical thought, but it is not an ability that should be tested under combat pressure. Military genius is a rare phenomenon. The assumption that all naval officers

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possess this trait in large enough proportion to function without standing doctrine courts failure in battle. Doctrine does not eliminate the need for a commander's intelligence or judgment, but it allows quick reactions drawn from a trusted knowledge base.

Doctrine must be accessible, timely, current, and clearly defined to be effective. If doctrine lacks just one of these attributes, it will not be effectively employed by the officers it is designed to support. For doctrine to have the desired effect, officers must be indoctrinated with it. Officers must know that doctrine exists, that it addresses current threats and capabilities, and that it has been successfully proven in combat or combat-like situations. Doctrine must also be clear and concise. If doctrine is not readily accessible, relevant, up-to-date, or understandable, commanders will not trust it, much less rely on it when lives are on the line.

This study examines the evolution of naval doctrine and the doctrine development process within the U. S. Navy. Over the past decade, the Navy has shown an increased interest in formalized doctrine. The importance of effective doctrine has been recognized and the desire to create such doctrine has been expressed at the highest levels of the Navy's organization. The question now facing the Navy is how to create a dynamic development process that produces and installs trusted doctrine in its fighting forces. The answer may be found in the Navy's own history, or it may lie in the promise of new technology. These areas will be explored, with the intent of generating insights that will aid in the development of that process.

B. RESEARCH QUESTIONS

1. Primary:

- Is Web-Enabled Doctrine a step forward in the evolution of a dynamic development process for naval doctrine?

2. Secondary:

- What is doctrine?

- What is the role of doctrine in naval warfare?

- How has naval doctrine evolved throughout the history of the U.S. Navy?

- How has the doctrine development process evolved throughout the history of the U.S. Navy?

- What is the current doctrine development process?

- What is a "dynamic development process?"

- How has Web-Enabled Doctrine been implemented in the development process?

- What is the process for a user to access publications and make recommendations using the Web-Enabled Doctrine?

- Is Web-Enabled Doctrine more of a dissemination tool or a collection tool?

- Do current technological limitations prevent Web-Enabled Doctrine from being used as intended?

- Does current policy prevent Web-Enabled Doctrine from being used as intended?

- What is the vision for Web-Enabled Doctrine's future?

## C.	THESIS OUTLINE	.

This study begins with an in-depth look at the theory of doctrine in chapter two. The research for this portion of the study consisted of a literature review of magazine articles, historical texts, and naval warfare publications. Several definitions of doctrine are explored and discussed. A distinction is made between doctrine and the related areas of policy, strategy, and tactics. Once the terminology has been established, the role of doctrine in naval warfare is addressed. The function of doctrine in a naval organization is examined fully.

Chapter II continues with an analysis of the history of doctrine in the U.S. Navy. The research for this portion of the study consisted of a literature review of historical texts and magazine articles. The origins of U.S. Naval doctrine are documented through an exploration of the history of foreign navies. Beginning with the American Revolution and continuing through the birth of the Nuclear Age, major doctrinal shifts and their surrounding circumstances are described and analyzed.

Chapter III begins with the examination of the history of the doctrine development process over the past three decades. The research for this portion of the study consisted of a literature review of naval warfare publications and interviews conducted with personnel at the Navy Warfare Development Command and associated organizations. The procedures for generating and maintaining warfare and doctrinal publications by the Navy Tactical Doctrine Activity and the Navy Tactical Support Activity from 1973 to

1993 are examined. The circumstances surrounding the establishment and subsequent disestablishment of the Naval Doctrine Command are discussed.

The next step in the study leads to a description of the current doctrine development process at the Navy Warfare Development Command. The research for this portion of the study consisted of interviews conducted with personnel at NWDC and a review of internal documents at NWDC. The current organization is defined at both the command level and at the level of the doctrine department. The doctrine development process is examined at both of these levels as well. The look at NWDC concludes with a description of Web-Enabled Doctrine, a new tool that is hoped will greatly improve the doctrine development process.

In Chapter IV, an analysis of the current process is conducted. This analysis addresses Web-Enabled Doctrine and how it fits into the concepts of the Web-Based Navy. The analysis also brings to light issues that are hindering the implementation and employment of Web-Enabled Doctrine. The last portion of the analysis identifies potential future directions for Web-Enabled Doctrine and the doctrine development process.

The last chapter of this study presents conclusions and recommendations based on the analysis portion of the study. The conclusions are drawn from historical facts and observation of the current doctrine development process. Recommendations are offered regarding the employment of information technology in the doctrine development process. Areas for future study on this topic, of which there are many, are presented at the end of this chapter.

D. METHODOLOGY

The methodology for data collection in this study was a combination of a literature review, personnel interviews, and a qualitative comparison analysis. The data for the background and history chapter were collected through a literature review of magazine articles, historical texts, and reference materials. The data for the chapter on the doctrine process were gathered through a literature review of internal documents at the Navy Warfare Development Command and interviews with current and former personnel at the command. The data for the analysis chapter were gathered through a qualitative comparison of the current implementation of Web-Enabled Doctrine to the vision for the Web-Based Navy.

Thirteen semi-structured interviews were conducted. They lasted from 45 minutes to approximately 90 minutes. The interview script in the Appendix was used as a basis for the interviews. Former NWDC personnel were interviewed to give a perspective on the establishment of NWDC and past processes. Current personnel were interviewed to provide insight into the current doctrine process and command relationships at NWDC. The same basic questions were asked of all interview subjects; however, more detailed questions were asked in the areas of expertise of the individuals.

E.   EXPECTED BENEFITS OF THIS THESIS

There are three main goals of this thesis. One goal is to help remove confusion about doctrine by providing clear definitions of terminology and the role of doctrine in naval warfare. The second goal is to tell the story of doctrine in the U.S. Navy. The third and most important goal is to provide analysis of the current doctrine process, address problems in that process, and give recommendations for improvements in the process. The next few paragraphs discuss why these goals are important and how they will be met.

United States naval officers seem to have an aversion to any mention of doctrine. Much of this stems from confusion surrounding doctrine. Terminology has been misused to the point that doctrine and TTP (Tactics, Techniques and Procedures) are almost synonymous to the average officer. The function of doctrine in naval warfare is not taught in Navy schoolhouses. In an attempt to alleviate these problems, this study provides clear definitions of terminology and an in-depth discussion of the importance of doctrine and its role in naval warfare.

One of the primary goals of NWDC is to create a dynamic development process for naval doctrine. The current doctrine development process must evolve to meet this goal. A key to fostering future evolution is understanding the previous evolution and iterations of the process. This study tells the story of doctrine throughout the history of the U.S. Navy, providing a record of its evolution.

The doctrine development process at NWDC is undergoing significant change as a result of the implementation of information technology. When a process experiences

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such change, there are bound to be areas that encounter difficulty. An outsider's observations may identify problems overlooked by those involved in the process on a daily basis. This study provides an impartial look at the process.

These three goals drive this study. At every point in this thesis, one or more are being directly addressed. Each of these goals is separate from, but intimately related to the others. The combination of the three provides a unique look at doctrine in the U.S. Navy.

II. BACKGROUND

A.   INTRODUCTION TO NAVAL DOCTRINE

Military doctrine probably has existed in one form or another since the existence of the first military force. Some military forces have had formalized, written doctrine. Others have relied on tradition and informal, unwritten doctrine. The fact that doctrine has always existed in the military does not mean that it has always been employed properly. When applied too strictly, doctrine can stifle judgment and original thought, leading to paralysis in unfamiliar situations. Loosely applied, doctrine can be just as damaging by failing to provide a common ground, possibly causing units of the same force to work at odds with one another. Military leaders are responsible for developing doctrine and determining how it should best be employed.

The development and employment of doctrine is of critical interest to leaders in today's Navy. The U.S. Navy has had a history of decentralized command with a high reliance on the judgment and capabilities of its local commanders. As a result, an individualistic culture has developed. In this "captain knows best" environment, doctrine has struggled to find a foothold. Any movement towards installing doctrine in the Navy must start with the very basics. These basics must include a standardized definition of doctrine and a clear explanation of its intended role in naval warfare.

## 1.	Doctrine Defined

Naval doctrine has been a difficult issue to address in the U.S. Navy. A primary reason for this difficulty is a general lack of understanding among naval officers about the meaning of the word doctrine. The term "doctrine" is often used interchangeably when referring to doctrine, TTP, or strategy. For example, every ship in the Navy has a set list of procedures for fighting a fire in the main engineering space, which is unfailingly titled the "main space firefighting doctrine (MSFD)." The MSFD clearly falls under the purview of TTP, but the addition of the word doctrine falsely categorizes it as "doctrine" in the mind of the naval officer. To avoid such misunderstandings, a clear, common definition of doctrine is essential if it is to be understood and used properly.

A general definition for doctrine, found in Webster's Dictionary, is "a principle or position or the body of principles in a branch of knowledge or a system of belief [Ref. 2:p. 342]." It is also defined simply as "something that is taught [Ref. 2:p. 342]." Looking at doctrine from an organizational perspective, it can be defined as those shared beliefs and principles that define the work of a profession [Ref. 3:p. 1]. The first two definitions describe what is contained in doctrine, while the third leans more towards describing the function of doctrine. The terms "knowledge" and "beliefs" are important in defining doctrine. Doctrine is a form of knowledge management. It is a means by which hard-earned knowledge is passed from one generation of professionals to the next. It is also the codification of a system of beliefs and principles. It is more than a set of

instructions or a checklist to be followed. It ties beliefs and principles to methods and procedures. It tells not only what should be done, but also why it should be done.

A perfect illustration of this concept is the Hippocratic oath taken by medical doctors. To this day, the medical profession uses the Hippocratic oath as its basic doctrine. "I will prescribe regimen for the good of my patients according to my ability and my judgment and never do harm to anyone..." is a phrase repeated by new doctors the world over. The exact wording and content of this oath has been modified over time, from the original fourth century B.C. form, to conform to changes in culture and social mores. In past and present versions, the duties of the doctor (prescribing regimens for the good of patients) are intimately combined with the implied belief that doing harm is immoral. Such a combination creates doctrine, and is the distinguishing trait that separates doctrine from procedures alone.

A thorough definition of doctrine must include a discussion of some distinguishing traits of doctrine. One trait of doctrine is that it is subject to change. The changes can be subtle or sweeping, but they are ever present. There are many factors that affect doctrine. New technologies, new applications of existing technology, or scientific discovery can change procedures. Social values shift over time and these shifts influence beliefs and principles. Traumatic events such as war or other disaster can cause change in values and beliefs. Anything that changes procedures or principles will begin a chain reaction with respect to doctrine. When procedures or principles change, doctrine must follow so that it remains current and applicable.

Another unique trait of doctrine is that it is often self-regulating. In most professions, the communities of professionals themselves develop their own standard doctrine [Ref. 3:p. 1]. Society allows this as long as these communities of professionals do not stray too far from common beliefs.

The preceding paragraphs give a definition and description of doctrine at a general level. For military applications, this definition must be refined and some key, distinct aspects of military doctrine must be explained. The official definition for U.S. military doctrine is found in Joint Publication 1-02. According to this publication, doctrine is: "fundamental principles by which the military forces or elements thereof guide their actions in support of national objectives. It is authoritative, but requires judgment in application [Ref. 3:p. 2]." This definition, though technically accurate, is too broad to be of much use to the war fighter. A more practical definition is:

> Military doctrines are beliefs or teachings, which have been reasoned from principles; that is, they flow from principles as a source. They are intended to be general guides for the application of mutually accepted principles...and...a practical basis for coordination under the extremely difficult conditions governing contact between hostile forces [Ref. 4:p. 334].

This definition delves somewhat into the role of doctrine, which will be discussed in detail in the next section, but it provides a more focused view that can be understood in a military context. This is the definition that will be used for doctrine for the remainder of this paper.

In addition to having a slightly different definition from doctrine in general, military doctrine differs somewhat in its attributes. One of the unique aspects of military

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doctrine is that it breaks down into different levels and types. Military doctrine exists at strategic, operational, and tactical levels of warfare [Ref. 3:p. 2]. Within the U.S. military, there exists joint doctrine for multi-service activities, combined doctrine for multi-national activities, and service doctrine for each individual branch of the armed forces [Ref. 3:p. 2]. The level of command and the scope of the activity determine which type and level of doctrine is applicable (e.g. joint strategic doctrine, service tactical doctrine, combined operational doctrine, etc.). Because of this trait, it is imperative to take great care in identifying both type and level when discussing military doctrine [Ref. 3:p. 4].

Another special trait of military doctrine is that it is highly susceptible, more so than other organizations' doctrine, to changes in a variety of factors. Changes in military doctrine can be driven by shifts in national policy and strategy, new technology, new threats, lessons learned from current and past operations, changes in government, and a number of other influences [Ref. 3:p. 5]. These factors affect the principles and values as well as the procedures contained in military doctrine.

There is one final attribute of military doctrine that distinguishes it from other professions' doctrine. As mentioned earlier, the professionals within a community usually create and regulate their own doctrine without external influences. This is not the case for military doctrine. Military forces are instruments of the governments they serve. Military forces rely on resources provided by the government and are subject to the will of the people represented by that government [Ref 3:p. 2]. Society demands a certain level of control over an organization to which it gives its sons and daughters to be trained

to kill and go into harm's way [Ref. 3:p. 2]. As a result, governmental policy, made by civilian officials, not military professionals, is a main driver of the principles contained within military doctrine [Ref 3:p. 1]. Military professionals are then left to create the procedures concurrent with these principles, thus synthesizing military doctrine. As long as the government's principles concur with those of military professionals, this situation works fine. Once the two groups begin to diverge on principles, however, problems develop. Military doctrine will continue to be developed to support governmental policy, but its importance in the view of the war fighter may diminish.

Naval doctrine, being a subset of military doctrine, is subject to the definition and attributes described above. It is important to note that the definition designated for use in this paper was developed by a naval officer for naval officers. Consequently, this definition is well-suited to naval warfare and acknowledges the important role doctrine should play in this arena.

2. Role of Doctrine in Naval Warfare

There must be a common understanding of the role of doctrine in naval warfare. An officer can be well versed in the definition and content of doctrine, but without the knowledge of how and when to employ doctrine, this knowledge is useless. The role of doctrine must be explicitly described and promulgated to the fleet. If its intended role is not defined, doctrine becomes just another publication gathering dust on a shelf.

A simple equation for naval warfare is not easy to synthesize. Ship for ship match-ups do not reveal the outcome of an engagement. The British fleet was

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significantly outnumbered during its 1588 defeat of the Spanish Armada [Ref. 5:p. 78]. Technological advantages do not guarantee victory. Merely having radar did not give U.S. ships any advantage in early WWII night engagements with the Japanese. Superior communication channels that allow a commander to relay orders and intelligence to subordinates do not make the ultimate difference. Nelson did not issue a single tactical signal after the first shot was fired at Trafalgar [Ref. 1:p. 182]. In each of these examples, the determining factor for victory was the presence and use of naval doctrine. The British introduced the "line ahead" and naval artillery doctrines at the Armada battle [Ref. 5:p. 2]; the Japanese had a well-developed doctrine for night engagements [Ref. 5:p. 135]; and Nelson's indoctrination of his subordinates is legendary. The conclusion drawn from these examples is that doctrine must play a significant role in naval warfare. The question that remains is: What role exactly?

Good leadership or command is essential for success in military operations. For small units, a single leader can direct the actions of each individual member of that unit and maintain situational awareness. As the size of the unit increases, it is subdivided into smaller units with leaders at each subdivision. This creates the familiar concept of a "chain of command." This chain of command is a mechanism for transmitting, interpreting, directing, and executing instructions [Ref. 4:p. 328]. It can be thought of as a skeletal structure for command. For this structure to become a living, functioning entity, it must be "augmented by flesh and sinew and infused with spirit [Ref. 4:p. 328]." At a conceptual level, providing the "flesh and sinew" (procedures) and the "spirit" (principles) is the role of doctrine.

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A naval combat environment often requires a subordinate unit of the organization to react to a situation before receiving direction through its chain of command. This reaction, however, must in some way be guided by the principles of the force commander. The subordinate officer, faced with an immediate threat or opportunity, usually does not have the means to obtain nor the time to await direct guidance from a superior. They must take action and base that action on a common understanding of the commander's intentions. The role of doctrine is to make these intentions known to the subordinates. When developed, promulgated, and used properly, doctrine will cause a subordinate to make the exact decision their commander, or any other officer indoctrinated by that commander, would make given the tactical situation. The fact that any officer in the command would make the same decision creates the phenomena of a "team mind" [Ref. 4:p. 330] and provides an organic harmonization of efforts.

For doctrine to fill this role, it must be fully understood and trusted by all officers in a command. This cannot be accomplished overnight. It must begin in the schoolhouses of the fleet and continue throughout an officer's development. Loyalty to a commander and the commander's plan only comes through familiarity and constant exposure. Full and proper indoctrination of officers must therefore occur over time [Ref. 4:p. 331].

In addition to its role in command, naval doctrine has played an important role in developments in naval history and the emergence of revolutions in military affairs (RMA). It is nearly as important for the naval officer to understand this role as the command role. Otherwise, doctrine can lose its relevance and the emphasis placed on its

development and employment wanes. A revolution in military affairs occurs when there is a fundamental shift in military strategy, doctrine, and tactics [Ref. 5:p. 125]. A lack of doctrine development either can stifle an emerging RMA or lead to defeat by a force that has taken advantage of an RMA [Ref. 5:p. 130]. The historical model of an RMA is that doctrinal development lags technological development [Ref. 5:p. 130]. Technology often exists well before the actual RMA occurs. Only when doctrine is tied to technology is the puzzle completed. A force that conducts parallel technological and doctrinal development runs far ahead of the pack.

The role that doctrine serves in command and warfare development has only been addressed in the U.S. Navy over the past decade. The importance of doctrine is only now being realized and emphasized, even though the impact that it has had on the history of the Navy is apparent from just a cursory glance at the history books.

B. ORIGINS OF U.S. NAVAL DOCTRINE

A third grade student can stipulate the fact that the United States as a nation has its roots in Great Britain. They most likely know that several other nations also had a significant role in the birth and development of America as a nation. With this rudimentary knowledge of American History, one can make the not so distant leap of faith in stipulating that the U.S. Navy and its doctrine have similar origins.

1.   Royal Navy Roots

It is not surprising to find that the origins of the majority of early U.S. naval doctrine can be traced to Great Britain's Royal Navy. At its inception, the U.S. Navy (then Continental Navy) was made up (like the rest of the fledgling nation) of British ex-patriots. It is logical that the U.S. Navy would adopt much of the doctrine of the premiere naval power at the time.

The origins of U.S. naval doctrine are so closely tied to those of the Royal Navy that it is necessary to first look at the beginnings of its doctrine. It was King Henry VIII that issued Britain's first written naval doctrine around 1538 [Ref. 5:p.1]. He based his set of instructions on Spanish doctrine, improved upon the concepts of naval artillery (which paid off later during Britain's victory over the Spanish Armada), and stressed the importance of taking the upwind side during battle [Ref. 5:p. 1]. Both of these basic tenets endured throughout the age of sail. The naval broadside and the line ahead, developed by British privateers, quickly worked their way into informal doctrine [Ref. 5:p. 2]. More formal doctrine would not be developed until 1636, when local commanders began indoctrinating subordinates with written instructions [Ref. 5:p. 3]. The British Parliament issued the Articles of War in 1652, which were shortly followed by the first written instructions from a fleet commander in 1653 [Ref. 5:p. 3].

Following these instructions and the Dutch-Anglo Wars, a major shift in British naval doctrine occurred, one that would have lasting effects until the 20th century. The concepts of naval artillery and massing force at sea had proven themselves in combat, and

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resulted in a shift towards a more offensive doctrine [Ref. 5: p. 3]. In the early 1700's, a split among naval officers began to emerge. The meleeists were on one side, with the belief that breaking the line and independent maneuver could best exploit tactical advantages [Ref. 5:p. 4]. The other camp contained the formalists, who emphasized the ability of the line ahead to bring maximum firepower to bear on the enemy [Ref. 5:p. 4].

In 1756, an event occurred that would further shape doctrine and its application in the Royal Navy. Sir John Byng was court-martialed and shot after failing to gain a victory over a French fleet off of Minorca [Ref. 5:p. 7]. He was shot, not for failing to follow existing doctrine, but for not fully exploiting an opportunity for victory [Ref. 5: p. 8]. This led to a tendency among British naval officers to become extremely aggressive in attempting to exploit the smallest opportunities for victory.

The development of offensive tactics, the acceptance of their use, and the move towards melee tactics signaled the aggressive nature of doctrine in the Royal Navy. The successes of Horatio Nelson, resulting from independent action and highly aggressive maneuver, only further fanned these flames. His victories at the Battle of the Nile and the battle of Trafalgar so impressed the Admiralty that all naval doctrine that followed was aimed at reclaiming that "Nelson Touch [Ref. 5:p. 18]." This led to a high emphasis on the offensive in British naval doctrine that was to last until World War II. It was out of these tendencies that the first American naval officers developed the traditions of the Continental Navy and its doctrine.

2. Other Nations' Influences

At its inception, the Continental Navy was significantly inferior to its main opponent, the Royal Navy. The Royal Navy was, at the time, the premiere maritime force in the world and was almost constantly engaged with contintental European powers. In nearly all cases, France and Spain engaged the British from a position of inferiority and developed doctrine to counter this disadvantage. It is only natural that the Continental Navy, and later the U.S. Navy, would draw on this doctrine in its struggles against the British.

The United States alliance with France during the American Revolution necessitated combined operations between French and American naval forces. French doctrine, being well-established and battle-proven against the British, was used by these combined forces and influenced the future development of doctrine in the U.S. fleet. French doctrine was mainly of a defensive nature [Ref. 5:p. 42]. Their doctrine emphasized merchant fleet protection and landing force protection rather than decisive engagement at sea between combatant fleets [Ref. 5:p. 42]. The French also employed the doctrine of a limited fleet engagement designed to occupy an enemy fleet, thus preventing the enemy from engaging a weaker force [Ref. 5:p. 37]. The French Navy had the most extensive doctrine for the employment of visual signals. Their doctrine in this area was the best in the world and was adapted by many navies of the era; it still provides the rudimentary basis for visual signals in modern navies. The influence of the French

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can be seen in much of U.S. naval doctrine, especially U.S. amphibious doctrine in the Pacific theater of World War II.

The influence of the Spanish Navy on doctrine in the U.S. Navy is much more subtle. The Spanish must be given credit for the origins of naval doctrine in many countries, especially formal written doctrine. It was the King of Castile that issued the world's first written naval doctrine in 1270 [Ref. 5:p. 77]. As mentioned earlier, it was Spanish written doctrine that was used as the basis for Britain's first written doctrine. Besides originating written doctrine, the Spanish Navy's main influence on U.S. naval doctrine was in the lessons learned from its failures. One of the lessons that was taken to heart in America was the minimal effect that a weakened Spanish Navy had during the Spanish-American wars of independence (1810-1824) [Ref. 5:p. 85]. Spain had attempted to pacify its American colonies with its naval forces, but the forces weren't even able to protect themselves from privateers [Ref. 5:p. 85]. The lesson that unfolded in the U.S. Navy's backyard was that a strong maritime force is essential in the maintenance of an overseas presence. This lesson was to play a major role in shaping U.S. Naval doctrine in the late 19th century.

C.   IMPACT OF DOCTRINE ON U.S. NAVAL HISTORY

As discussed in the definition of doctrine and the discussion of its traits, naval doctrine is constantly changing. U.S. naval doctrine has not been immune to these changes. Major doctrinal shifts have been observed during times of war or times of major

technological change or times of geopolitical change. It is important to understand the causes of the doctrinal shifts that have occurred over the Navy's history. Identifying the cause and effect relationship between certain occurrences and naval doctrine, illustrated by historical examples, can provide a basis for predicting the need for new or revised doctrine in the face of current events. The following sections explore major doctrinal shifts in the U.S. Navy, the reasons for these changes, and the impact the doctrinal shifts had on the Navy.

1. American Revolution to the War of 1812

The groundwork for U.S. naval doctrine was laid during the American Revolution and the following 40 years. The traditions and doctrine established during these times continue to affect doctrine today. The legacies of John Paul Jones, Stephen Decatur, and Oliver Hazard Perry emerged during this era, creating lasting influences on the way U.S. naval officers fight at sea.

Initially, the American government had no desire to create a permanent naval force, just a force capable of harassing the British fleet and meeting the basic needs of the war effort. The American Navy during the Revolution was not one naval force, but several forces that sometimes operated together, but most often independently. The Continental Congress commissioned the Continental Navy, and eleven of the thirteen colonies created their own naval forces [Ref. 6:p. 3]. These forces played an important role in the American war effort, undertaking such missions as local defense, support of land operations and commerce raiding [Ref. 6:p. 3]. Each of these missions was

undertaken out of necessity. The reasons for these missions and the conduct of these missions led to the development of early American naval doctrines.

The first doctrine of American naval forces dealt with the protection of commercial vessels and maritime trade. In June 1775, two vessels, chartered and operated as a part of the Rhode Island Army, conducted clearing operations in Narragansett Bay with the intention of weakening the British stranglehold in the area [Ref. 6:p. 4]. This is the first American example of organized naval operations with a clear purpose. The British problem in Rhode Island prompted the state's delegates to propose to the Continental Congress the formation of an "American fleet [Ref. 6:p. 6]." As a result of this proposal, the Continental Navy was created on October13, 1775, when two ships were outfitted and armed with orders to intercept British shipping in the Saint Lawrence River [Ref. 6:p. 6]. Two weeks later, Congress outfitted additional ships to "be employed in such manner, for the protection of defense of the United Colonies [Ref. 6:p. 6]." An American "fleet" of eight ships, under the command of Esek Hopkins, was sortied in January 1776, with orders to clear Chesapeake Bay of enemy raiders that had been wreaking havoc on commerce in the area [Ref. 6:p. 7]. Once the Chesapeake was cleared, the fleet was to sail north and perform similar operations in the Narragansett region [Ref. 6:p. 7]. This first "fleet" action represented the emphasis on the doctrine of commerce protection that would become a mainstay of U.S. naval doctrine.

Naval support of land operations was another doctrine developed during the Revolution. It was actually General George Washington who created the first "national" naval force on October 2, 1775, almost two weeks prior to the establishment of the

Continental Navy [Ref. 6:p. 4]. Washington's forces held dangerously low supplies of gunpowder, and his pleas to Congress for re-supply went unanswered [Ref. 6:p. 4]. He realized that the quickest way, and probably the only way, for him to get the supplies he needed was to steal them from British supply ships [Ref. 6:p. 4]. He chartered a 78-ton schooner and gave orders to avoid contact with armed British vessels and to prey only on transport and supply ships [Ref. 6:p. 4]. The sole purpose of this operation was to indirectly support the needs of the forces ashore, and it set the precedent for naval doctrine along these lines. American Doctrine for direct support of ground forces through naval action would not be developed (actually adopted) until the French Navy entered the war. As previously mentioned, the French Navy had sound doctrine for defending and supporting land forces with naval action and employed this doctrine at Yorktown in 1781 [Ref. 5:p. 39]. American naval officers could not help but be influenced by the success of the doctrine employed by the French.

Commerce raiding also became a key doctrine of the early American Navy. The operations of Washington's schooner squadron discussed in the previous paragraph provide the origins not only for land support doctrine, but for commerce raiding as well. The commerce raiding operations that were most influential for American naval doctrine actually took place overseas. In January 1777, the first foreign operations of American naval forces occurred in the English Channel [Ref. 6:p. 16]. Lambert Wickes commanded the *Reprisal*, which captured five British prizes after delivering Benjamin Franklin to France for diplomatic purposes [Ref. 6:p. 16]. These successes led to the establishment of an American squadron of three ships, based in France, which conducted

operations as far north as the Irish Sea [Ref. 6:p. 16]. These ships captured 18 British

prizes, and so enraged the British that a diplomatic storm developed between the British

and French, resulting in the expulsion of the ships from their French bases [Ref. 6:p. 16].

The success of these operations cannot be measured in only the number of prizes taken.

The British were forced to protect shipping at home, thus limiting the resources available

to press further operations in America. The political storm that arose exacerbated

relations between France and Britain. This situation forced the British to keep resources

close to home to defend against the French threat, and possibly hastened France's entry

into the war in support of the American colonies. The final benefit, and the one most

closely related to doctrine, is that, for the first time, Americans realized that they could

operate overseas with success.

Many American squadrons conducted commerce raiding operations in European

waters throughout the remainder of the war. It was during these operations that one of the

most influential battles, with respect to U.S. naval doctrine, occurred. The September 23,

1779 duel between *HMS Serapis* and John Paul Jones' *Bonhomme Richard* had

resounding doctrinal effects in the U.S. Navy [Ref. 7:p. 10]. The battle itself holds little

significance in the area of tactical doctrine. The importance of this battle lies in the

fighting principles demonstrated by Jones in his famous quote: "I have not yet begun to

fight!" The tenacity and courage displayed by Jones became cornerstones of the U.S.

naval officer's fighting doctrine that remain to this day.

Following the American Revolution, the naval policy of the new nation was

uncertain. Many politicians opposed maintaining a permanent navy in view of its cost

and the perceived lack of a threat from overseas enemies. The detractors of the Navy purported that a navy is a tool of an imperialist state, and that just having a navy was sure to involve the U.S. in overseas conflict. On June 3, 1785, the Navy's opponents triumphed and the Continental Navy's last frigate, *Alliance*, was sold [Ref. 7:p. 15]. For the next nine years, the United States was without a navy [Ref. 7:p. 15]. While the American colonies were still under British control, they received the protection of the Royal Navy for their overseas trade. Once independence was won, American shipping was left to fend for itself. As early as 1783, the Barbary Coast nations of North Africa began to seize American ships in the Mediterranean, demanding tribute for safe passage [Ref. 7:p. 16]. In January 1791, the Senate Committee on Mediterranean Trade issued a report stating that only a strong naval force could protect the nation's overseas commerce [Ref. 7:p. 15]. In 1793, President George Washington indicated his support for the establishment of a navy with a recommendation for the construction of six frigates to protect American ships from the Algerines [Ref. 7:p. 16]. Mainly as a result of the threat to overseas commerce, the United States Navy was established on March 27, 1794, with congressional authorization for the construction of six frigates [Ref. 7:p. 16]. With its inception so closely tied to commerce protection, it is not surprising that one of the most enduring doctrines of the U.S. Navy is the protection of sea lines of communication.

The years between the establishment of the U.S. Navy and the declaration of war on Great Britain in 1812 saw the development of doctrine for combatant battles at sea and convoy operations. The Quasi-War with France (1798-1801) provided the first opportunity for combatant vs. combatant action for the infant U.S. Navy. In February

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1799, the frigate *Constellation* won the U.S. Navy's first victory over a combatant in an engagement with the French frigate, *L'Insurgente* [Ref. 7:p. 18]. This engagement is important because it reinforced for the U.S. Navy the standard naval doctrine regarding the use of naval artillery. The battle was decided through the skillful use of raking fire. Though it carried a larger crew and could have still repelled boarders, *L'Insurgente* struck its colors following two rounds of devastating raking fire from the American ship [Ref. 7:p. 17]. In addition to combat doctrine, the Quasi-War, saw the first use of convoy doctrine by the U.S. Navy. The first convoy escorted by the U.S. Navy sailed in July of 1800 [Ref. 7:p. 18] The Quasi-War with France ended in February 1801, with only one American ship lost compared to the 85 French ships (including two frigates) captured by the U.S. Navy [Ref. 7:p. 19]. This respectable showing against a major continental European power, emboldened the Navy and its doctrine.

Other doctrinal developments during this period occurred during the War with Tripoli (1801-1805). Operations during this conflict provided the basis for special operations doctrine, and amphibious warfare combined with shore bombardment doctrine. The exploits of Lieutenant Stephen Decatur during his operation to destroy the captured frigate *Philadelphia*, at anchor in Tripoli harbor beneath the protective guns of the Pasha's castle, had an effect on fighting principles similar to that of John Paul Jones [Ref. 6:p. 40]. Decatur's plan to sneak into the harbor, set the *Philadelphia* afire, and fight his way back out was successful, and became a model of ingenuity and bravery for U.S. naval officers to emulate. Another significant operation occurred when General William Eaton led a force of 400 Arabs and seven U.S. Marines on a cross-desert march

from Alexandria, Egypt to the Tripolitan town of Derna [Ref. 7:p. 24]. Under supporting fire from the brig *Argus* and the schooner *Nautilus*, the small force captured the town and forced the Pasha to the negotiating table [Ref. 7:p. 24]. This combination of ground forces supported by naval fires provided an example that was to influence future amphibious doctrine.

The War of 1812 raised several doctrinal debates in the U.S. Navy. At the commencement of hostilities, the U.S. Navy consisted of 17 seaworthy vessels while the Royal Navy had over 1000 combatant ships [Ref. 7:p. 28]. Such a disparity between the forces required the senior Captains of the U.S. navy to debate the method for the employment of its scarce resources. John Rodgers, the senior commander, advocated forming all of the ships into a single squadron and sailing to the British Isles to engage the British ships while they were on station operating singly or by twos or threes and eliminate them one by one [Ref. 6:p. 47]. Stephen Decatur, now a Captain, voiced the opposition to this plan, stating that the U.S. fleet should be dispersed to operate singly or in pairs to conduct commerce raiding operations [Ref. 6:p. 47]. To support his argument, Decatur recalled the recent successes of commerce raiding by the French and also made the point that if a single ship or pair of ships was engaged by a British Fleet, the loss would be much less than if the entire American fleet were engaged and wiped out in a single battle [Ref. 6:p. 47]. There were, of course, some personal reasons behind the differing arguments of the senior leadership, but both arguments had their merits, and the Navy's leadership found itself in a doctrinal conundrum. The decision made was a compromise: creating two squadrons, one under Rodgers' command, the other belonging

to Decatur [Ref. 6:p. 47]. Continuing fear of the British fleet's numerical superiority led to the consolidation of the two squadrons shortly before the declaration of war in June 1812 [Ref. 6:p. 47]. Rodgers' fleet captured only seven small prizes in the ensuing months, while the frigates *Constitution* and *Essex,* cruising singly after failing to rendezvous with Rodgers' squadron, each captured a British man-of-war [Ref. 6:p. 48]. It seems that historical evidence supports Decatur's doctrine over Rodgers'.

A discussion of naval doctrine and the War of 1812 is not complete without a review of the exploits of another U.S. naval hero, Oliver Hazard Perry. Perry commanded the Lake Erie squadron, which consisted of nine ships mounting 54 guns [Ref. 7:p. 32]. He met and engaged a British squadron of six ships mounting 64 guns, commanded by Commodore Robert H. Barclay, a veteran of Trafalgar [Ref. 7:p. 32]. Perry closed and engaged the British line with his flagship, which was inexplicably unsupported by the other ships of his squadron and subsequently disabled. Perry then left his disabled ship, rowed to the brig *Niagara*, and reengaged the British, breaking their line and capturing all of their vessels [Ref. 7:p. 32]. This stunning victory gained full control of Lake Erie and allowed future offensive operations to recover Detroit from the British [Ref. 7:p. 32]. The example provided by Oliver Hazard Perry further strengthened the ideals and principles with which the Navy attempted to indoctrinate all of its officers.

2.   Civil War

Between the years of 1815 and 1861, the United States was not forced into any major confrontations at sea. The lack of action led to a stagnation of naval doctrine.

Even the introduction of steam propulsion did not spur any significant doctrinal development. As a matter of fact, the introduction of a more reliable means of propulsion led to a re-application of the pre-artillery tactics of ramming! There were, of course, certain events during these years that demonstrated the application of existing naval doctrine. The Barbary Wars presented the origins of the doctrine of "gunboat diplomacy" which the U.S. Navy applied around the world. Naval officers established contact and diplomatic relations with several foreign countries, beginning with Captain David Geiseinger's 1833 treaty with Siam and culminating with the opening of Tokyo Bay by Commodore Matthew C. Perry in 1854 [Ref. 7:p. 60]. The Mexican War saw liberal application of amphibious warfare doctrine and the employment of the U.S. Marines, most famously at the storming of Chapultepec Castle in Mexico City [Ref. 7:p. 56]. For the most part, doctrine continued as established, with little innovation or re-evaluation until the beginning of the Civil War in April 1861.

The first action of the American Civil war was the Confederate naval bombardment of Fort Sumter, but both sides knew that it would not be a naval action that decided the war. Naval strategists on both sides knew that there would not be a decisive, Trafalgar-like fleet engagement on the open ocean. Neither the United States nor the Confederacy had a fleet capable of such action. The South lacked the resources to build such a fleet, and the North had no need to build one as the Confederacy did not have one or pose the threat to build one [Ref. 8:p. 161]. From this knowledge, both sides deliberated which doctrines should to apply to their respective fleets. Not surprisingly, the doctrines selected matched the 18th and 19th century historical pattern of conflict: the

side with the stronger naval force adopted a blockading doctrine with the intent of strangling its opponent's economic resource base and mounting periodic amphibious assaults, while the weaker side adopted commerce raiding tactics and coastal defense measures [Ref. 8:p. 162].

One of the unique doctrinal aspects of the Civil War was that, for the first time, American naval officers could develop and employ doctrine from a position of relative naval strength. The U.S. naval command decided on the employment of a traditional blockading doctrine. The blockade of Confederate ports taxed the U.S. Navy to its limits and represented an important change in its doctrine. The United States had argued internationally that for a blockade had to be enforceable in order to be legal. The South had nearly 3000 miles of coastline that, according to doctrine, had to be closed. In 1861, the U.S. Navy numbered approximately 42 active duty vessels, many of which were on foreign station [Ref. 8:p. 162]. There was no possible way for the North to enforce what it had defined as a "legal" blockade. In the end, pragmatism won out and the principles behind the doctrine of blockade changed to accept the application of a "best effort" blockade.

The doctrine adopted by the Confederate Navy had considerable effect on the establishment of new doctrine in the U.S. Navy. In an attempt to develop doctrine and tactics that would break the Union blockade, the Confederates developed three types of ships: rams, raiders, and runners [Ref. 8:p. 164]. The "rams" were ironclad rams with rifled guns located in turrets. They were built with the intent of providing coastal defense and breaking the blockade through direct engagement. The "raiders" were wooden ships

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powered by a combination of sail and steam. These vessels were to pursue the traditional *guerre de course* by preying on Union commercial shipping. The "runners" were fast, shallow draft vessels designed to carry cargos from Southern ports to points of transfer in the Caribbean. Other than being designed to counter the blockade, these three ship types had another thing in common: steam propulsion. The extensive use of steam propulsion by the South forced its proliferation in the U.S. Navy. This presented a problem that was first experienced by the Navy during the Mexican war. The refueling of steam ships was difficult at sea and was best accomplished at shore stations. In addition to this requirement, the steam ships were much more reliant on shore stations for maintenance and upkeep. These factors made it imperative for the U.S. to seize bases for naval operations on Confederate shores. This represents the genesis of the doctrine of forward bases of operations.

Another major doctrinal event that would affect navies throughout the world was the obsolescence of the wooden hull brought about by improvements in gunnery and the introduction of the ironclad. The epic duel between the *Monitor* and the C.S.S. *Virginia* off of Hampton Roads in March 1862 marked the beginning of a new era in naval warfare. Confederate Secretary of the Navy Stephen Mallory had espoused a vision of a single "supership" that could rip through an entire wooden blockade fleet on its way to shelling a coastal town (e.g. New York) into submission [Ref. 8:p. 166]. The *Virginia* easily dispatched two wooden blockaders and was well on the way to realizing this vision at Hampton Roads before the *Monitor* arrived and instigated the aforementioned engagement. Although it failed in fulfilling the vision for its employment, the *Virginia's*

exploits and the threat of a single vessel having such an impact shaped doctrinal development for the U.S. Navy well into the next century.

Like other American conflicts, the Civil War witnessed the emergence of another naval personality that would have an effect on doctrine. In August 1864, Rear Admiral David Glasgow Farragut led a Union squadron of four monitor ships and 14 wooden-hulled screw sloops against the defenses of Mobile Bay, Alabama [Ref. 7:p. 85]. To enter the bay, the squadron first had to pass through a narrow channel that was heavily mined on the west side. The lead ship in the squadron, the monitor *Tecumseh*, made a westerly turn towards the CSS *Tennessee* that took it dangerously close to the minefield. The *Tecumseh* struck a mine and sunk in minutes, taking 90 of 114 hands on board [Ref. 7:p. 85]. Upon witnessing this tragedy, the lead element of wooden-hulled ships, the *Brooklyn*, began to backwater, threatening to throw the entire column into disarray. It was at this moment that Farragut bellowed to his Flag Captain on the *Hartford*, "Damn the torpedoes! Full speed ahead...! [Ref. 7:p. 86]." The *Hartford* surged past the *Brooklyn*, leading the squadron into Mobile Bay where it soundly defeated the Confederate ships on station. Farragut's intuition told him that most of the mines were old and most likely inoperable. He also knew that maintaining the ships of his squadron in a column formation was the safest way to traverse the minefield. His intuition, courage, and clear thinking under pressure defined the way that U.S. naval officers should react in battle for future generations.

3. Alfred Thayer Mahan and the Spanish-American War

For the next quarter of a century, there would be little doctrinal change in the U.S. Navy. Throughout its history, the Navy had found its identity in the protection of commercial shipping and providing coastal defense for the American continent. The relative peace of this era (1865-1890) did not provide much validation for this view of the Navy. Commercial shipping was done mostly aboard foreign flagged vessels (much the same as today), and there was little fear in the general population of interference or attack from overseas naval forces. America did not see itself as a great maritime nation with vital interests abroad that needed protection. Most Americans were thankful for the "blessing" of oceans to the east and west and weaker states to the north and south. For the most part, the United States was happy in its relative isolation, but its Navy, struggling for an identity and a purpose, was not.

The rumblings of the coming naval renaissance had been shaking the foundations of naval doctrine around the world for years. The advent of steam propulsion and its pursuant requirements for forward coaling and maintenance stations slowly increased the need for offensive elements capable of long-range deployments. The rising popularity and prominence of ironclad ships and the increase in their abilities created new concerns as well. The balance of power among European states, which had contributed greatly to an enduring 19th century peace, had given way to imperial competition, mainly between Germany and Britain. This competition led to a wild grab for coaling stations and forward bases around the world. The Caribbean was vulnerable to European penetration.

From Caribbean stations, European powers could exert their influence and dominate trade through the prospective canal in Panama [Ref. 9:p. 10]. Weakly defended California and the rest of the American west coast then would be vulnerable to these European powers as well as threats from South American navies. American interests in the Samoan islands were threatened by German and Britain involvement in the region [Ref. 7:p. 98]. All of these factors combined to present a situation that was untenable with current naval forces.

The transformation of the U.S. navy and its doctrine began with the publication of Captain Alfred Thayer Mahan's treatise on naval strategy, *The Influence of Sea Power Upon History, 1660-1783*, in 1890. Mahan based most of his analysis and conclusions on a study of the lengthy maritime struggle between Great Britain and France. Mahan's overriding conclusion was that victory at sea resulted only when a navy concentrated its operations on engaging and vanquishing an opposing fleet, thus winning "command of the sea" [Ref. 7:p. 99]. He also claimed that America should view itself as a maritime state in a world full of strong opposing navies. The U.S. Navy of the time consisted of detached cruiser squadrons operating throughout the world and monitors for coastal harbor defense at home [Ref. 9:p. 2]. In Mahan's view, this kind of navy was inadequate. Enemy ships approaching in fleet strength could not be stopped by commerce raiders, and blockades could not be broken by harbor defenses. Americans had to realize that they faced a national security crisis that had to be met offshore. He promoted a new overarching doctrine for the Navy, "offensive sea control." Part of this doctrine called for the restructuring of the existing naval force into a battle fleet. Sea control could only be established by a concentrated battle fleet that was ready to meet an enemy battle fleet in a

decisive engagement at sea. American experience in the Revolution, the War of 1812 and the Civil War had demonstrated that such a fleet could not be improvised or created after the commencement of hostilities. Such a fleet had to be in existence during times of peace as well as war. Mahan stated that command of the sea, won by the battle fleet, was paramount and a precondition to the successful completion of secondary missions such as the establishment or breaking of a blockade, or the protection or destruction of shipping. Mahan sounded the call for the creation of a United States Navy consisting of offensive battleship fleets employing the doctrine of offensive sea control.

Mahan based one of his main principles on the principles of land warfare espoused by the Swiss General A.H. Jomini. The most prominent of Jomini's principles adapted by Mahan, itself borrowed from the earlier writings of Carl Von Clausewitz, was the concept of "centers of gravity" in battle. This concept states that massed offensive force should be applied against weaker enemy forces at some decisive point [Ref. 9:p. 14]. Mahan's adaptation of this concept emphasized "fleet concentration" as a guiding doctrine. American naval officers took this proclamation to heart and added the corollary, "never divide the fleet [Ref. 9:p. 14]." Using Mahan's sea control principles and his emphasis on the offensive, the U.S. Navy established the doctrine of seeking out a decisive fleet engagement. The Navy also instituted the doctrine of taking the fight to the enemy rather that waiting for the enemy to appear off of its home shores. In keeping with this theme, the Navy became a proponent of forward-deployed elements capable of supporting this doctrine. Mahan's influence on the Navy and its doctrine was profound. Naval officers that had struggled with finding an identity and purpose for existence

latched onto Mahan's theories with unfailing devotion. Mahan lifted the Navy to a position of preeminence in national strategy, and provided a new sense of purpose and dignity for its officer corps.

Mahan's influence extended beyond the reaches of the naval service into Congress. In 1890, the United States had the twelfth largest navy in the world [Ref. 9:p. 11]. Clearly, the goal of offensive sea control was not achievable from this position. *Sea Power* created a groundswell of public opinion in support of its principles and generated interest at many levels of government. Just over a month after the publication of Mahan's work, Congress authorized the construction of three new battleships [Ref. 7:p. 99]. This begins the buildup of American naval power that will see the United States Navy move to a position of third in the world by the time of Mahan's death in December 1914 [Ref. 9:p. 11].

The first opportunity for the application of Mahanian principles in an operational scenario came with the Spanish-American War in 1898. Upon the commencement of hostilities with Spain in April 1898, the U.S. Navy wasted little time in employing its new doctrine. The first application of Mahanian doctrine was the order for Commodore George Dewey's Asiatic Squadron to sortie from Hong Kong and engage the Spanish fleet in the Philippines [Ref. 7:p. 103]. This operation was in keeping with the doctrine of using forward-deployed battle fleet to aggressively seek out a decisive engagement with the opposing fleet. Though successful, the Battle of Manila Bay was not the prototypical fleet engagement envisioned by Mahan. Instead of engaging the opposing fleet in the open ocean, Dewey entered Manila Bay under cover of night and, upon

daybreak, shelled the anchored Spanish fleet. However, this egagement was hailed as a triumph of the new doctrines and did much to further their acceptance. The Battle of Santiago, fought off of Cuba in August 1898, was important for the validation of the new doctrine because it represented the first time that the new battleships saw significant action. A concentrated American fleet under the overall command of Acting Rear Admiral William T. Sampson had bottled up Spain's main battle fleet in the harbor at Santiago. The Spanish commander, Rear Admiral Pascual Cervera y Topete, under orders from the governor general of Cuba, attempted a desperate escape from the harbor, and the American battleships destroyed the entire Spanish fleet. Once again, Mahanian doctrine, reinforced by the decisive fleet action at sea, was applauded and gained momentum. This momentum carried the U.S. Navy into the 20th century and sustained it through the years leading to World War I.

4. World War I and the Inter-War Years

As mentioned earlier, the United States possessed the third largest navy in the world at the commencement of World War I. This is a testament to the strength of Mahan's influence. The early years of the 20th century saw an increase in the United States' overseas holdings and foreign economic interests. This was an ambitious time for the United States, but relatively peaceful. The lack of direct threats to the U.S. mainland and the brewing troubles in Europe brought renewed calls for isolationist policies. There were repeated calls to halt further construction of battleships and to reign in the "imperialist" tendencies of the Navy. These isolationist movements failed to gain traction

in a world where several countries were undertaking significant programs to increase their naval strength, namely Germany and Japan.

In 1908, the U.S. Navy proclaimed its Mahanian rebirth to the world in an impressive display of sea power. The round-the-world cruise of the "Great White Fleet", consisting of 16 battleships with their supporting colliers and auxiliaries, demonstrated the American ability to place a formidable battle fleet anywhere in the world. The cruise was unprecedented and many naval detractors said that it was technologically infeasible. The naysayers were proven wrong and the cruise was a total success. The cruise was doctrinally important because it proved that the Navy had the means with which to carry out its espoused doctrine. The proven abilities of the battle fleet and the growing threats in both the Pacific and the Atlantic led to the commissioning of the first American dreadnoughts in 1910 [Ref. 7:p. 123]. These were the first true dreadnoughts built on a par with those of Great Britain and Germany. These battleships and others like them would secure the United States position as the third most powerful navy in the world in 1914.

At the outbreak of World War I in Europe, President Woodrow Wilson issued a series of neutrality proclamations and begged all Americans to be impartial "in thought as well as in action [Ref. 8:p. 247]." Wilson walked a fine line between proclaiming U.S. neutrality and preparing for its defense. Naval strategists were clamoring for the concentration of battle fleets to patrol the waters offshore of the American east coast [Ref. 8:p. 247]. Such battle fleets were created and placed on station, but a new threat posed serious problems for "command of the sea." Great Britain had imposed a virtual

blockade of the European continent and had bottled-up the German High Seas Fleet in the North Sea. To counter this, Germany declared a war zone around Great Britain, in which it would sink enemy merchant ships without warning. The weapon they would use to enforce this war zone was the U-boat. In May 1915, a German U-boat sank the British passenger liner *Lusitania*, killing almost 1200 people, including 128 Americans [Ref. 8:p. 249]. Americans were enraged by these new rules of warfare. American naval officers were deeply concerned, as this new submarine warfare doctrine threatened any navy's ability to maintain sea control. The *Lusitania* incident marked the beginning of the U.S. Navy's serious preparation for war. One of the most prominent voices in this time was that of the Assistant Secretary of the Navy, Franklin Delano Roosevelt. He made a public statement that:

> Our national defense must extend all over the western hemisphere, must go out a thousand miles into the sea...We must create a Navy not only to protect our shores and our possessions, but our merchant ships in time of war, no matter where they may go [Ref. 8:p. 249].

This rhetoric resulted in a $285 million package centered on the construction of four new battleships and four battle cruisers [Ref. 8:p. 249]. The Battle of Jutland in May/June 1916 seemed to reinforce the doctrine of battle fleets seeking out decisive engagements and encouraged U.S. building plans in an upward direction. The end result of this was that the U.S. Navy, like many other navies, became increasingly invested in battleships.

This overwhelming support of the battleship as the ultimate naval weapon seemed to ignore what was actually happening at sea. The much praised and emulated British battle fleet was unable to gain any semblance of sea control around its own home islands.

In February 1917, Germany resumed unrestricted submarine warfare within the war zone declared around Great Britain, and in so doing, drew the United States into World War I [Ref. 7:p. 135]. *Guerre de course*, so maligned by Mahan, was proving to be Germany's saving grace. With the resumption of unrestricted warfare, Germany hoped to starve Britian into submission before the U.S. could mobilize its forces and effect the outcome of the war. Great Britain's naval strategists could not conceive of pulling destroyers from the blockade of the German High Seas fleet to conduct escort operations for its increasingly vulnerable commercial ships. An American naval officer assigned as the direct link between the U.S. Naval command and the Bitish Admiralty would refocus attention on this most pressing threat.

Rear Admiral William S. Sims promoted the idea that a convoy sytem was the key to defeating the U-boat threat. When ignored by the Admiralty, Sims took his plan directly to the British Prime Minister, David Lloyd George. Lloyd George bought the convoy plan and intervened directly with the Admiralty. The beneficial results of the convoy system were immediate. Shipping losses began to decrease, while the number of U-boat sinkings increased. For a time, ship-building efforts in the U.S. shifted completely away from the construction of capital ships and concentrated wholly on building destroyer–type escort vessels [Ref. 9:p. 255]. Breaking the U-boat threat proved to be the key to the war, allowing unmolested transport of American personnel and materiel across the Atlantic. It is important to note the difficulty experienced by Sims in selling his plan to both the British Admiralty and the U.S. naval command. Both navies

were so focused on their Mahanian doctrine that they were unable to see beyond its paradigms. For Great Britain, this inability nearly proved fatal.

As soon as World War I was over, its lessons seemed to be forgotten. Despite the near defeat of Great Britain at the hands of submarines, the battleship remained "king of the seas" in the eyes of the world's navies. Naval arms treaties between the U.S., Great Britain, and Japan focused only on the numbers of capital ships (battleships and the new aircraft carriers). Submarines were completely ignored in these negotiations. Another branch of naval warfare that was somewhat overlooked was naval aviation, which was in its infancy during these years. The first shipboard takeoff and landing of an aircraft occurred within a year of each other in 1910 and 1911 respectively [Ref. 7:p. 124]. In 1921, General Billy Mitchell conducted an experimental air attack in which he bombed and sank a former German battleship, subsequently claiming that the sinking signaled the end of the surface warship [Ref. 7:p. 145]. These experiments in naval aviation culminated in the commissioning of the U.S. Navy's first aircraft carrier, the *Langley*, in March 1922. Though recognized as having important applications in naval warfare, the full extent of aviation's effect on doctrine would not be realized until the first months of American involvement in World War II. In 1941, the U.S. Navy was intent on maintaining the doctrine that had fueled its growth for 50 years: offensive sea control affected by battleship fleets.

## 5.	World War II

World War II changed the face of naval warfare forever. New technology, tactics, and ideology forced sweeping changes in naval doctrine throughout the world. In some cases, these changes merely modified existing doctrine, but in others, the changes required the synthesis of completely new doctrine. The Pacific theater of World War II would serve as the stage for nearly all of the major doctrinal changes that occurred.

Following the Russo-Japanese War of 1904-1905, Japan emerged as a premiere naval power in the Pacific and the United States chief Mahanian rival in the region. War Plan Orange was formalized in 1911 as a scheme for meeting the threat of Japanese aggression in the Pacific [Ref. 9:p. 270]. One of the basic tenets of Plan Orange was that the U.S. would maintain a 5:3 ratio with Japan in the Pacific in all classes of fighting ships and personnel [Ref. 9:p. 270]. By the end of 1922, the bulk of the U.S. battle fleet was stationed in the Pacific. In keeping with the Mahanian doctrine, the heart of this fleet was the battleship. Aircraft carriers were components of this fleet, but their role was to provide air defense for the battleships. In May 1940, the entire U.S. Pacific battle fleet was permanently stationed in Pearl Harbor, Hawaii [Ref. 9:p. 291]. Instead of having a deterrent effect on Japanese aggression, this fleet became a target of that aggression. The Japanese attack on Pearl Harbor, which resulted in the destruction or disabling of the eight American battleships in port [Ref. 9:p. 306], forced the Navy to depart from its deeply held battleship doctrine.

The following six months, December 1941–May 1942, witnessed some of the most dynamic doctrine development in the history of the United States Navy. There were three main naval doctrines that emerged from this flurry of activity. The most immediate shift was a return to the traditional American doctrine of *guerre de course*, but with submarines as its instruments. The second development was the establishment of the aircraft carrier as a means of power projection through aircraft raids. The third new doctrine was the designation of the aircraft carrier as the main capital ship of the battle fleet.

The Navy felt a deep-seated need to avenge the men and ships that it had lost at Pearl Harbor. The most quickly deployable and only available means for this purpose were the submarines stationed at Pearl Harbor, which had been overlooked by the Japanese attackers in their zeal to destroy the battlewagons. The Navy took the previously unthinkable step of declaring unrestricted submarine warfare on Japan. This action is a perfect example of how grave circumstances can cause shifts in morals and principles among officers, leading to the employment of a doctrine that was once abhorrent to those same officers.

The second doctrinal development, which represented another extension of the U.S. Navy's desire for quick revenge, was exemplified by the Halsey-Doolittle raid on Tokyo. The ability to project power ashore through air raids launched from aircraft carriers was a significant factor throughout the war. The material effect of the Tokyo raid was minimal, but the strategic effects were far reaching, because it caused Japan to designate significant military resources for defense of the home islands. This prevented

those resources from being used in other theaters of operations. The doctrine of carrier-launched air raids would become a major tool for U.S. naval commanders.

The last of these new doctrines employed by the U.S. Navy was the doctrine placing the aircraft carrier at the center of the battle fleet. The incapacitation of the entire Pacific battleship fleet at Pearl Harbor forced the Navy to develop this doctrine. In removing the battleship from the equation, the striking power of carrier aircraft was released from its role of air defense for the fleet. This allowed the aircraft to be employed offensively against an enemy fleet. This doctrine was regarded with skepticism by the Navy's "gun club" of battleship Admirals, but it proved itself as viable and necessary at the Battle of the Coral Sea (May 7-8 1942). At Coral Sea, the entire engagement was fought with carrier-based aircraft engaging surface combatants. The surface elements of the two forces never even sighted each other; much less get close enough to engage with surface fire. This doctrine was reinforced less than a month later by the American victory at the Battle of Midway.

The success of submarine doctrine and carrier doctrines did not sound the death knell for Mahanian doctrine in the U.S. Navy. The basic tenets of offensive sea control remained the same. A main objective of both the U.S Navy and the Imperial Japanese Navy (IJN) was to draw its opponent into a major fleet engagement on the open ocean. The IJN's attempt at this resulted in the previously mentioned Battle of Midway. As the war progressed and the U.S. regained parity and superiority in the Pacific, it too searched for that decisive fleet engagement.

It was the search for the decisive, open-ocean fleet engagement that nearly led to a major disaster for the U.S. Navy. By late 1943, the U.S. had gained enough momentum in the Pacific to proceed with a modified version of War Plan Orange and launched its island-hopping campaign through the Central Pacific with the invasion of Tarawa. For the next several months, the U.S. Navy refined its amphibious doctrine to a near art form. The refinements of amphibious doctrine included the addition of air elements for support and defense of the landing fleet as well as procedures for "softening up" the beachhead. In June 1944, the Navy began its campaign in the Marianas Islands. It was during this campaign that a major conflict between existing doctrines emerged. Vice Admiral Raymond A. Spruance's Fifth Fleet had taken station to the Southwest of the Marianas to provide a protective screen for the amphibious landing force against the Japanese "Mobile Fleet". Spruance held his carrier task force close to the landing force, patiently providing a defensive screen in accordance with the Navy's refined amphibious doctrine. There were indications that the Japanese fleet was nearby, and Spruance's task force commander, Rear Admiral Marc A. Mitscher, lobbied that his Task Force 58 should be detached in order to seek out the Japanese fleet in a decisive engagement. Spruance declined the request and his patience paid off at dawn on 19 June, when the force's radars detected an incoming wave of Japanese aircraft. The resulting engagement became known as the "Great Marianas Turkey Shoot," in which the American task force destroyed 350 Japanese planes, and in a chasing action destroyed one carrier and two oilers, while damaging two other carriers [Ref. 9:p. 324]. There were rumblings, however, back at Pacific fleet headquarters that Spruance had missed a chance for the all-

important decisive fleet engagement. Spruance's relief, Admiral William J. "Bull" Halsey, was determined not to make the same "mistake."

Halsey was a Mahanian in the strictest sense of the word. He was determined to search out the decisive fleet engagement with the main Japanese battle fleet. At the Battle of Leyte Gulf, Halsey was presented with what he perceived to be such an opportunity. In late October 1944, General Douglas MacArthur, embarked in the U.S. Seventh Fleet, conducted an amphibious landing on Leyte Island in the Philippine archipelago. Halsey was in command of the Third Fleet, which provided protection to the landing force from Japanese advances through the Sibuyan Sea and the northern approaches to the Philippines [Ref. 10:p. 63]. Admiral Kinkaid's Seventh Fleet was made up of the landing force and a task force defending the southern approaches through the Surigao Strait [Ref. 10:p. 63]. Halsey's direct orders from Admiral Nimitz, CINCPAC, were to "cover and support forces of the Southwest Pacific (Kinkaid's Seventh Fleet)," but with the loophole, "in case opportunity for destruction of the enemy fleet offers or can be created, such destruction becomes the primary task" [Ref. 9:p. 326]. Halsey took advantage of this loophole upon detecting a Japanese carrier force to the north of the Philippines. Believing he had neutralized an advancing Japanese force in the Sibuyan Sea, Halsey took his entire fleet north to pursue an engagement with the Japanese carrier fleet. In keeping with Mahanian doctrine, he kept his fleet concentrated without detaching any elements to remain and defend the approaches through the Sibuyan Sea. Halsey made several miscalculations in his pursuit of the decisive engagement. He overestimated the damage his forces had inflicted on the Japanese force in the Sibuyan

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Sea and underestimated the tenacity of the Japanese commander, who continued his advance. Halsey also overestimated the strength of the Japanese carrier force to the north, which was in fact a toothless decoy sent with the exact purpose of drawing him away from the landing force. All of these miscalculations led to near disaster when the Japanese central force of battleships and cruisers advanced through the Sibuyan Sea and approached the nearly defenseless landing force. If not for the heroic actions of a few brave captains of destroyers and auxiliary carriers, the landing force might have been completely destroyed. The doctrinal lesson of this battle is significant. A commander must ensure that when conflicting doctrines exist, a clear order of precedence must be stated and promulgated to subordinates. In this case, Halsey, Kinkaid, and Nimitz were all playing from different sheets of music, and the results were nearly disastrous.

Unlike the lessons of World War I, the lessons of World War II were taken to heart and provided a basis for future doctrinal development. The importance of submarine warfare and naval aviation were impossible to ignore and were now closely interwoven with the Navy's existing doctrine. It was the development and employment of atomic weapons at the end of World War II, though, that would bring about the most profound changes in future U.S. Navy doctrine.

6.   The Nuclear Age

At the end of 1945, United States Navy was the preeminent naval force in the world. With this came the mantle that had been carried for centuries by Britain's Royal Navy. Even at this time, its finest hour, the Navy came under fire from critics. A civilian

strategist, Bernard Brodie, wrote in 1946 that, "the Navy's indubitably superb accomplishment in the greatest of all naval wars will not facilitate its taking the lead in revaluing its own place in the national security [Ref. 11:p. 1]." The scope of the Navy's victory threatened to make it obsolete in the eyes of many strategists; there just were not any naval threats to the United States left in the world. The advent of the atomic bomb brought out scores of "Mitchell-ites" claiming that *all* military forces, save strategic air forces, were now obsolete [Ref. 11: p. 1]. Secretary of the Navy James V. Forrestal, appointed in 1944, would provide the direction and the voice that the Navy would need to survive these attacks and reinvent itself.

Forrestal was described as a cold warrior before the Cold War began. His greatest contribution to the Navy was the identification of the Soviet Union as the most likely threat to U.S. security. He stressed the need for the maintenance of a strong naval force despite the deafening public cries for a large peace dividend. He argued that, "the outstanding lesson of the past quarter century is that the means to wage war must be in the hands of those who hate war [Ref. 11: p. 11]." Alas, the American public did not listen.

At the close of World War II, the Navy consisted of 3.4 million officers and enlisted personnel, 1200 combatant ships, and more than 40,000 aircraft [Ref. 6:p. 292]. By June 1950, naval personnel numbered 375,000, major combatants were down to 237, and aircraft numbered only about 4300 [Ref. 6:p. 292]. In 1949, hard times were made harder when, acting with new authority granted by Congress, the Secretary of Defense cancelled the construction of the first post-war aircraft carrier, the *United States* [Ref. 6:p.

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293]. It seemed to the Navy that efforts were underway to divest it of its air arm. Top naval officers registered vocal complaints regarding the cancellation of this ship and expressed their displeasure with the Air Force's expensive B-36 program, thus prompting congressional hearings on the subjects. The Vinson hearings of 1949 gave the Navy a forum in which to plead its case for balanced forces capable of a wide range of conventional and nuclear warfare [Ref. 6:p. 294]. The Vinson committee report, completed in March 1950, sympathized with the Navy's advocacy of balanced forces and also indicated that army and air force officers were not competent to determine which weapons were necessary for the sea service [Ref. 6: p. 295]. The Navy was beginning to win support in Congress and build the momentum to carry it into a new era. The Korean War would provide the catalyst to begin the rebuilding of the U.S. Navy.

Though not a naval war, the Korean War emphasized the need for increased spending in all areas of defense in the face of communist aggression. It opened the eyes of the American public as to just how far the United States' military might had deteriorated. It also solidified the Communist Bloc, led by the Soviet Union, as a clear and present threat to the national security of the United States. The Navy was prepared for this re-awakening and presented its plan for a naval force and naval doctrine to counter the Soviet threat to American national security.

Naval doctrine for meeting the Soviet threat was an extension of the Mahanian principle of sea control. The Navy would not stop at merely engaging an enemy fleet; it would carry the fight to an enemy's shores. The Navy had proven its ability to project power ashore in the air raids and amphibious operations of World War II. The role and

capabilities of the aircraft carrier would expand. The new Forrestal class of "super-carrier" was designed with the capabilities necessary for this role. Smaller nuclear weapons were developed that could be employed by carrier-based aircraft. The Navy was molding itself into a strategic nuclear force.

Another key doctrine for the new Navy was an increased emphasis on anti-submarine warfare. Both World Wars had demonstrated the serious threat that a relatively small number of submarines could present to even the most powerful navies. By 1950, the Soviet Union had approximately 350 submarines [Ref. 6:p. 295]. To counter this threat, the Navy increased its acquistion of anit-submarine platforms, including destroyers and frigates.

The Navy also created doctrine to expand the role of its own submarine forces. As early as 1946, the Navy began conducting experiments testing the ability to launch pilotless, cruise missile-type craft from submarines [Ref. 6:p. 307]. Experiments in the area of propulsion systems led to the successful development of nuclear power as a means of submarine propulsion. The nuclearization of the submarine force in the 1950's and 1960's increased the role of the submarine in naval doctrine. The submarine was now a true stealth platform that could perform a variety of missions: anti-surface warfare, anti-submarine warfare, strike warfare using cruise missiles, intelligence gathering, and most importantly, strategic deterrence. The marriage of the nuclear submarine and the ballistic missile secured the Navy's hold on one third of the strategic triad.

The Navy had indeed transformed itself into its vision of a strategic force. As a result, the Navy now had doctrine for all the levels of warfare (tactical, operational, and

strategic) and the means by which it could employ this doctrine. The Cold War Navy and its doctrine would last until the fall of the Soviet Union in the early 1990s. Once this occurred, the Navy again found itself without the mission and purpose to which it had molded its force structure and doctrine. More than one hundred years after its introduction, Mahanian doctrine seems to have run its course. Naval doctrine is now being influenced by the writings of Sir Julian Corbett's treatise, *Some Principles of Maritime Strategy* [Ref. 12:p. 7]. Corbett stresses the use of naval forces in support of land forces while controlling the local sea areas, not necessarily gaining total command of the sea. These ideas are evident in the naval documents *...From the Sea* and *Forward... From the Sea*. The new direction and doctrines for the Navy still are being determined. An ever-changing geopolitical situation and the lack of a clear threat make this a difficult task. The current potential for a revolution in military affairs as a result of the influence information technology further complicates the Navy's situation. In this environment, the doctrine development process must be careful and thorough.

III. THE DOCTRINE DEVELOPMENT PROCESS

A.   U.S. NAVY'S DOCTRINE DEVELOPMENT PROCESS (1973-1993)

The history of the doctrine development process in the U.S. Navy is more difficult to track than the doctrine itself. Little documentation exists for past processes, and the documentation that does exist is difficult to find. A few remaining Naval Warfare Publications exist that outline the general details of the process from the early 1970s to the 1990s. The process delineated in these publications deals only with tactical doctrine. Doctrine for the higher levels of warfare was not formally developed and promulgated. It was resident in the traditions of the Navy and some important treatises, primarily Mahan's writings [Ref. 12:p. 7]. The doctrine development process of this era had all of the key elements for successful doctrine: maintenance and promulgation of a doctrinal library, concept development, and experimentation.

The Navy recognized the importance of maintaining its hard-earned knowledge. This knowledge management assumed the form of a library of tactical, doctrinal, and procedural publications. This library included Naval Warfare Publications (NWP), Fleet Exercise Publications (FXP), and Allied Tactical Publications (ATP), as well as many others [Ref. 13:p. 1-1]. Naval Warfare Publication 0 (NWP 0), in its various revisions through the years, provided the instruction for the development of new publications and the review and maintenance of existing publications. It put in place the basic framework that still exists today.

NWP 0 created the Primary Review Authority (PRA), the Coordinating Review Authority (CRA), the Technical Review Authority (TRA), Contributing Commands (CC), and a clearinghouse for producing doctrinal publications. The PRA was designated as the commander with the overall responsibility for the review of a specific tactical doctrine publication within the Navy [Ref. 13:p. 1-7]. The PRA is responsible for collecting, reviewing, and compiling inputs for doctrinal publications and submitting them to the Chief of Naval Operations (CNO) via both Fleet Commanders [Ref. 13:p. 1-7]. The CRA coordinates all inputs regarding a publication from his respective fleet prior to submission to the PRA [Ref. 13:p. 1-8]. A TRA functions similarly to a PRA, but deals with technical or administrative areas [Ref. 13:p. 1-8]. Commands such as the Judge Advocate General, the Bureau of Naval Personnel, and the Bureau of Medicine and Surgery are examples of TRAs for their respective publications. Contributing commands were defined as any command that provided input for tactical publications [Ref. 13:p. 1-8]. The clearinghouse for publishing and distributing publications was the Navy Tactical Doctrine Activity (later changed to the Navy Tactical Support Activity, NAVTACSUPPACT) [Ref. 13:p. 1-9]. NAVTACDOCACT was assigned the responsibility for processing all of the recommended changes received and submitting these changes to the CNO for approval prior to distribution [Ref. 13:p. 1-9].

The process for reviewing and revising publications was linear and tedious. Recommendations and revisions flowed through many levels and were tied to a strict schedule of reviews. Each publication was placed on a schedule for review. When the prescribed time arrived for a review, Contributing Commands sent their inputs to the

```
FM      ORIGINATOR
TO      PRA
INFO    CNO, Washington, D.C.
CINCPACFLT or CINCLANTFLT
NAVAL SAFETY CENTER, Norfolk, Va.
NAVTACSUPPACT, White Oak, Md.
(Others as appropriate; see Appendix B of NWP 0)

CLASSIFICATION//NO3510//

SUBJ: URGENT CHANGE RECOMMENDATION FOR NWP

A. NWP 0
B.     AS REQUIRED
1.     IAW REF A, URGENT CHANGE IS RECOMMENDED
FOR NWP _____

2. PAGE _____ART/PARA.____NO.____ LINE/SENTENCE _____
FIG. NO.____

3.    PROPOSED NEW TEXT (Classification included)

                        (OPTIONAL)

4.     JUSTIFICATION
```

Figure 1. Sample Message Format For Urgent Change

CRA, who reviewed and consolidated the inputs before submitting them to the PRA, who reviewed the inputs and submitted recommendations for changes to the CNO and NAVTACDOCACT [Ref. 13]. Items considered to be of such vital importance as to warrant immediate change could be submitted by naval message (Fig. 1) [Ref. 13:p. 1-18]. Routine changes, however, were held until the next review cycle arrived. Dependent on the review schedule, valid changes could be delayed for years.the review process was instituted with the purpose of keeping doctrine current, but it resulted in a system that provided more convenience for the publishing activity than utility for the war fighter.

Concept development and experimentation are essential for the creation of new doctrine and are alluded to, but not directly discussed in NWP 0. In a section discussing new tactics, NWP 0 states:

> Commands are encouraged to recommend new tactics for fleet evaluation. While individual commands are discouraged from promulgating their own tactics and procedures for routine operations, they may employ special procedures for preliminary evaluation of new tactics [Ref. 13:p. 1-2].

This quote comes from the 1973 revision D, and demonstrates that in the early 1970s, the fleet was the main source for the development of concepts and also the main test bed for these concepts. NWP 0, revision L, promulgated in 1981, provided new procedures for new doctrine and tactics with the Navy's Tactical Development and Evaluation (TAC D&E) program [Ref. 14:p. 1-16]. The TAC D&E management organization was established and contained elements from the fleet CINCs, fleet commanders, type commanders, and special development commands. Some products of this program were lessons learned, Tactical Memorandums (TACMEMOS), and Tactical Notes (TACNOTES). This system provided a hierarchy for concepts under development. As new concepts or tactics were tested and evaluated they progressed up the hierarchy until incorporated into a Naval Warfare Publication. TACMEMOS could be developed while major systems were under development and provide basic tactical doctrine once the system met initial operational capability. TACMEMOS were cancelled automatically after two years unless incorporated into a TACNOTE or NWP. TACNOTES promulgate tactics and procedures that have been fully tested and accepted. If a discrepancy was noted between a TACNOTE and an NWP, the TACNOTE took precedence as it was the

most recently approved publication. TACNOTES, like TACMEMOs were cancelled after two years if not incorporated into an NWP.

As mentioned earlier, this process had all three of the key elements for successful doctrine development: a doctrine library, concept development, and experimentation. The problem was that the elements were not tied closely enough together. Concept development must begin with a thorough search of existing doctrine. This prevents redundant doctrine. Concepts that have been developed and tested must be promulgated to the fleet in a timely fashion. For these things to occur, there must be direct communication between the organizations that develop and test doctrine and those that publish it. Periodic reviews and long chains of submission prevented the timely adaptation of new developments and led to a stagnant doctrine library. The fall of the Soviet Union and the lessons of the Gulf War highlighted a need for sweeping changes in doctrine. Naval leaders realized that the existing process was flawed and a new process was needed to develop the new doctrine.

B.   NAVAL DOCTRINE COMMAND (1993-1998)

The concept of a naval organization with the sole responsibility of developing, evaluating, and disseminating doctrine began to gain popularity in the Navy by the early 1990s. In April 1992, the Vice Chief of Naval Operations focused the efforts along these lines with this statement:

> ...The decision has been made to establish a Naval Doctrine Center. This new command will fill a long standing void within the Navy by providing an organizational focus for dealing with the development, dissemination

and evaluation of doctrine. This new center will also serve as the vehicle for working with other services to develop complimentary doctrine...[Ref. 15]

The wheels were set in motion for the new organization. The next year would bring naval leaders together to discuss concepts for the new "naval concepts and doctrine center." In January 1993, the Chief of Naval Operations, Admiral Frank Kelso, issued the charter for the Naval Doctrine Command (NDC), the first formal doctrine center in the history of the U.S. Navy [Ref. 16].

The mission of the Naval Doctrine Command was made up of seven basic functions [Ref. 15]. NDC was to serve as the primary centralizing authority for the development of naval concepts and for the development and evaluation of Navy (USN) and naval (USN/USMC) doctrine. It also would provide for a unity of effort in Navy/Marine Corps doctrine development. NDC would act as the naval voice in joint and combined doctrine development. It would establish and conduct close liaison with the Marine Corps Combat Development Center (MCCDC), joint, combined, and other service doctrine centers. NDC would work directly with Navy/Marine Corps centers of excellence, Navy training and education commands, and the Fleet. In coordination with the Chief of Naval Education and Training (CNET) and appropriate naval training commands, NDC would ensure that Navy, naval, and joint doctrine would be addressed in training and education curricula, and in operations, exercises and war games. Lastly, NDC would serve as a member of the Navy lessons learned committee and Tactical Development and Evaluation steering committee.
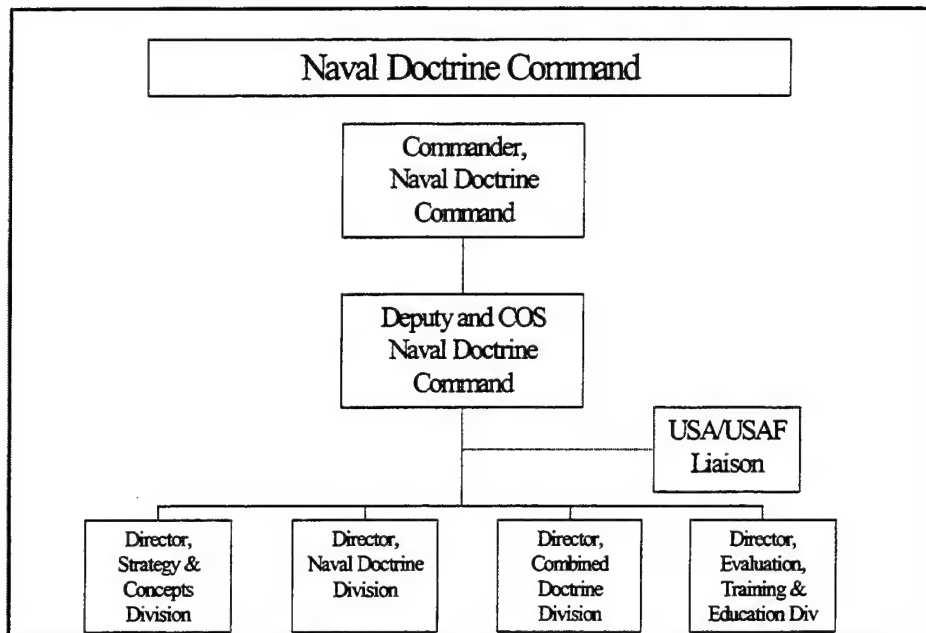
Figure 2. Organizational Structure of the Naval Doctrine Command

To accomplish these functions, NDC was organized into four divisions: the Strategy and Concepts Division, the Naval Doctrine Division, the Joint and Combined Doctrine Division, and the Evaluation, Training, and Education Division (Fig. 2) [Ref. 15]. Each of these divisions had a set of tasks for which it was responsible. The Strategy and Concepts Division had the primary task of evaluating the impact of national security strategy, national military strategy, new strategic concepts, national defense policy, and contingency planning on naval doctrine. This division also would coordinate the development of naval strategic and operational concepts that would influence doctrine development and fleet operations. It would serve as the Navy's central point of contact for strategic concept development matters and global war gaming. The Naval Doctrine

Division would be responsible for coordinating the development of Navy and naval doctrine with fleet and Marine Corps war fighting centers of excellence to address the operational level of warfare. Another important function of this division would be to develop and maintain Navy and naval doctrine to link naval tactical doctrine with joint and combined doctrine. It also would be the central point of contact for the development of Navy and naval tactical and operational doctrine. This division also would assist the Fleet and war fighting centers of excellence in the identification of tactical deficiencies in NWPs and fleet tactics. The final major responsibility of this division was that of disseminating doctrine via Naval Warfare Publications and other doctrinal publications. The Joint and Combined Doctrine Division was the coordinated USN/USMC voice in joint air/land/sea/space and combined doctrine development. It served as the Navy CRA for joint, multi-service, and combined doctrine and tactics. The last division, the Evaluation, Training, and Education Division, was responsible for ensuring that all levels and types of doctrine were included in training and educational curricula. This division also was tasked with assessing current doctrine during regularly scheduled war games. Another important function of this division was to sponsor war games and Doctrine Review Advisory Group (DRAG) meetings to validate newly developed concepts and doctrine.

Early products from NDC showed promise. The Naval Doctrine Publications (NDP) were the first attempt at creating a formal operational level doctrine in the Navy. These ca

pstone publications described the roles of U.S. naval forces and disseminated operational level principles for employment [Ref. 17:p. 1-2]. They linked naval strategy to TTP and were primarily educational publications. NDPs were developed in the areas of overall naval warfare (NDP 1), naval intelligence (NDP 2), naval operations (NDP 3), naval logistics (NDP 4), naval plans (NDP 5), and command and control (NDP 6).

NDC had all of the mechanisms in place to create a successful doctrine development process. The Strategy and Concepts Division was the tool for generating concepts. The Education, Training, and Evaluation Division provided the mechanism for evaluating the doctrine in practice as well as a means for identifying areas for experimentation. The Naval Doctrine Division, supported by NAVTACSUPPACT, became the producer and custodian for the doctrine library. With the inclusion of the Joint and Combined Doctrine division, NDC addressed all types of doctrine at all levels of warfare (Fig. 3)
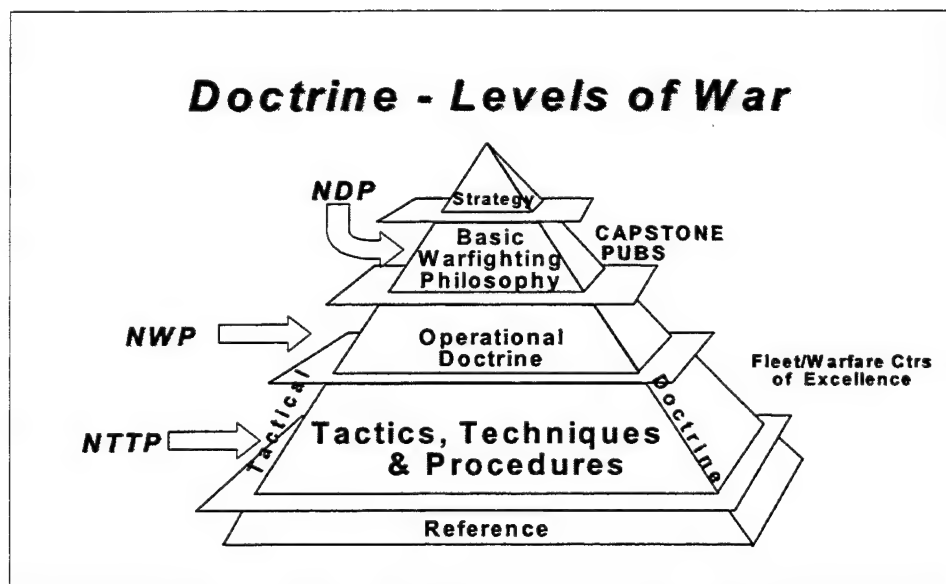

Figure 3. Levels of War and Levels of Doctrine

Despite the promising initial products and the presence of the necessary mechanisms for doctrine development, NDC did not fill the mission for which it was intended. There were several factors that contributed to this failure. NDC fulfilled prophecies that it would be cut off from fleet input and become a stovepipe for doctrine. The physical location of NDC, in Norfolk, Virginia, ensured that it would be heavily influenced by politics and the local commands (e.g. CINCLANTFLT). In this situation, fleet commanders did not feel they had much input into the products from NDC, and they were thus less likely to use them. Another problem at NDC was the lack of funding and scheduling for experimentation. Concepts cannot progress beyond concepts without experimentation. If existing concepts are not developed, new concepts will stop being generated. The vision for the Naval Doctrine Command had placed concept development as the center of gravity for the organization. In the vision's implementation, the center of gravity became the support of the Naval Warfare Publication library. This was the situation that plagued NDC. The Naval Doctrine Command was a very timely and innovative experiment in doctrine development. Fortunately, naval leaders recognized the beneficial aspects of NDC as well as its problems aspects. In June 1998, the Chief of Naval Operations disestablished the Naval Doctrine Command and established the Navy Warfare Development Command with the intent of capitalizing on the recent lessons learned.

C. NAVY WARFARE DEVELOPMENT COMMAND

The Navy's path of doctrine led to its current doctrine center: the Navy Warfare Development Command. NWDC was designed to serve a unique role, based upon the model of the Naval Doctrine Command, but with several key differences. Today, NWDC serves as the Navy's crossroads for innovation, transformation, doctrine, and concept development [Ref. 18:p. 1]. The next sections explore how NWDC fills this role by examining the following areas: the establishment and mission statement of NWDC, the NWDC command process, NWDC's doctrine department process, and the new idea of Web-Enabled Doctrine.

1. The Establishment of NWDC and Its Mission Statement

The Navy Warfare Development Command was created as a replacement for the Naval Doctrine Command. NDC had not fulfilled the expectations of Navy leadership or the fleet. It was decided that the best way to capitalize on the good points of NDC, while avoiding its pitfalls, was to establish a completely new and separate command in a different location.

Newport, Rhode Island was chosen as the location for the new command. There are two primary reasons that Newport was selected. First of all, Newport is geographically distant from any major operational commands or political centers (e.g. Washington, D.C). By locating the new command in Newport, Navy leadership hoped to lessen political or command influences that could hamper the doctrine development

process. The second main benefit of Newport as a location is that the new command would be co-located with the Naval War College (NWC) and the Strategic Studies Group (SSG). These three organizations would form a unique triumvirate for strategic and doctrinal concept development. NWDC would conduct current doctrine development, concentrating on a 5-10 year timeframe for new concepts. SSG would experiment with future concepts on a 20-25 year timeframe. NWC would provide the academic validation for new concepts with historical and empirical analysis. The coordination between these three organizations provides exciting possibilities for doctrine development.

NWDC was not created as a completely stand alone command. One of the problems of NDC was that it became somewhat isolated from the fleet and other commands. To hedge against this possibility in the new command, NWDC was tied closely to the War College. The President of the Naval War College was designated as the Immediate Superior in Command (ISIC) for NWDC [Ref. 19]. The OPNAV notice that disestablished NDC, issued in June 1998, included three main parts. First, it disestablished NDC and NAVTACSUPPACT [Ref. 19]. The second part was a mission modification statement for the NWC [Ref. 19]. The last part was the establishment of the Navy Warfare Development Command [Ref. 19].

The Naval War College always has been a center for strategic thought. The new mission statement expanded this role to include:

> ...[assisting] in the development of Navy strategy, ...[acting] as the center for research and gaming leading to the development of advanced operational and war fighting concepts, ...[coordinating] NWC support for concept development, experimentation and doctrine development; to approve Navy warfare doctrine and concepts...[Ref. 19].

With this new mission statement and its role as NWDC's ISIC, NWC now was intimately

tied into the doctrine development process.

The mission statement for NWDC set the foundation for the new command.

Inevitably, there are some similarities between the mission of NDC and NWDC. NWDC

was created to absorb and expand upon all of the functions of NDC. Despite this, there

are some important differences. NWDC's initial mission statement tasked it to:

> ...serve as the primary Navy point of contact for the **development of Navy operational and war fighting concepts**, naval doctrine and joint and combined doctrine development; to plan and **coordinate experiments employing emerging operational concepts**; to represent the Navy with joint and other service battle laboratories/facilities and tactical development commands; to ensure naval and joint doctrine are forwarded for incorporation in training and education curricula; to **publish and disseminate naval doctrine**; and, to perform such other functions and tasks as may be assigned by higher authority [Ref. 19].

The bolded items in the mission statement illustrate a key characteristic of NWDC that

provides the potential for success. For the first time, a single command has the three

functions necessary for doctrine development (concept development, experimentation,

and doctrine library maintenance) consolidated under one roof. NWDC had been given

the tasking for these functions, and the next step was to create an organizational structure

and process to accomplish them.

2. Current Command Organization and Process

Creating an organization to accomplish all of the interrelated functions of doctrine

development was a difficult task. It is obvious that there must be a department

responsible for each of the individual functions required for doctrine development. What is not so obvious however, is how these departments should relate and interact during the development process.

The following descriptions of the NWDC organization and command process present NWDC's vision of how the process is designed to work. This vision has been promulgated as the way NWDC will attempt to accomplish its mission. As with any process, it does not always proceed in the prescribed manner. This is especially true with the NWDC process since it is still in its initial implementation.

NWDC is divided into four departments: Concept Development, Doctrine, the Maritime Battle Center (MBC), and Operations (Fig. 4) [Ref. 20].

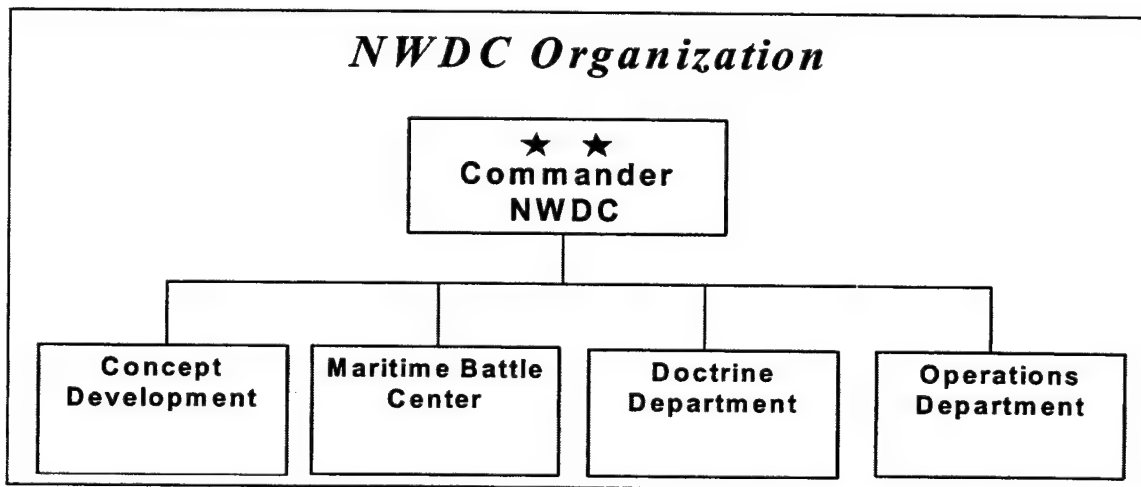Figure 4. Organizational Structure of the Navy Warfare Development Command

The Concept Development department is expected to provide the fuel for innovation [Ref. 20]. It is designed to be responsible for gleaning concepts from various sources and "fleshing them out" until they provide a viable basis for experimentation. The Doctrine department serves several functions. It maintains and provides a doctrinal baseline from

which the Concept Development department can begin its development of new concepts [Ref. 20]. It also acts as the voice and ears of NWDC by promulgating doctrinal products to the fleet and receiving feedback from the fleet on those products. The Maritime Battle Center is the experimentation arm of NWDC. It should coordinate with Concept Development and Doctrine to plan for the experimentation of concepts in development. MBC also is the main vehicle for maintaining relationships with fleet commanders, mainly established during the planning of Fleet Battle Experiments (FBE) [Ref. 20]. Operations department is responsible for the research and analysis that is necessary for evaluation of tested concepts. They or their subcontractors collect and compare experimental findings, publish those findings, and if required, make recommendations for concepts requiring further experimentation [Ref. 20].

The industrial principles of scientific management and assembly line production are unlikely to lead to a dynamic development process. By applying traditional industrial principles to the NWDC organization, one might design a linear process such as: (1)Concept Development generates new concepts for testing; (2)MBC schedules and conducts experimentation of the new concepts; (3)Operations evaluates the results and determines if the concept is ready to be formalized as doctrine or needs more testing; (4)Doctrine takes the approved concept, folds it into doctrine and promulgates it to the fleet. This process ignores the interrelationship of the functions of the different departments. These departments must work together synergistically for the development of doctrine. Fortunately, NWDC has recognized the intricacies of the situation and has developed a process with this in mind. For this process, there is a coordinating entity, the

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Warfare Innovation Supervisory Board (WISB), which represents the Commander's senior leadership [Ref. 20]. The WISB provides strategic oversight for the accomplishment of NWDC's mission through a coordinated process [Ref. 20]. This process is broken down into five phases: process initiation, FBE planning and execution, analysis and review, product development, and doctrine promulgation [Ref. 20].

Phase I, process initiation, begins with the WISB establishing timelines and departmental points of contact (POC) for new development projects [Ref. 20]. During Phase I, the Concept Development, Operations, and Doctrine departments begin a collective front-end analysis and, if required, the war gaming or limited objective experimentation for proposed concepts [Ref. 20]. Phase II, FBE planning and execution, is headed primarily by MBC. During this phase, MBC coordinates and conducts the Concept Finalization Conference, the FBE Initial Planning Conference, the Main Planning Conference, the Final Planning Conference, and FBE execution [Ref. 20]. It is during this phase that most of the fleet involvement occurs. The numbered fleet commanders have substantial input to the process in planning FBEs, recommending concepts for development, and identifying the doctrinal needs of the fleet. Phase III, analysis and review, falls under the purview of Operations department. In this phase, Operations department collects and compares experimental findings as described above. Phase IV, product development, is headed by Doctrine department and consists of product proposals and doctrine formulation. Phase V, promulgation, is the approval and dissemination of dynamically developed doctrine. The last three of these phases do progress in a fairly linear fashion, one cannot proceed without the prior being completed,

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but the process is not compartmentalized. Phase I is where most of the collaboration between the departments occurs.

This collaboration is achieved through the use of Warfare Innovation Development Teams (WIDT) and CODE (Concepts, Operations, Doctrine, Experimentation) Teams [Ref. 20]. The WIDT is comprised of resident subject matter experts (SME) from each department [Ref. 20]. A WIDT serves the Concept lead as the research entity for the development, collection, and maturation of concepts, test doctrine, and fleet experiment requests [Ref. 20]. This collaboration at the beginning of the process is the key to establishing relationships and cooperation throughout the process. The CODE Team is made up of members from each of the departments and selected WIDT members [Ref. 20]. The CODE team does not come into play until Phase II. During the phases, the lead department's representative heads the team and directs its efforts [Ref. 20]. For example, during Phase II, the MBC lead member heads the team's efforts in researching and planning for FBEs and experiment facilitation during FBE execution. This continues for the remainder of the process and provides an avenue for communication between the departments. Without the use of these teams, the process runs the risk of becoming linear and losing synergy.
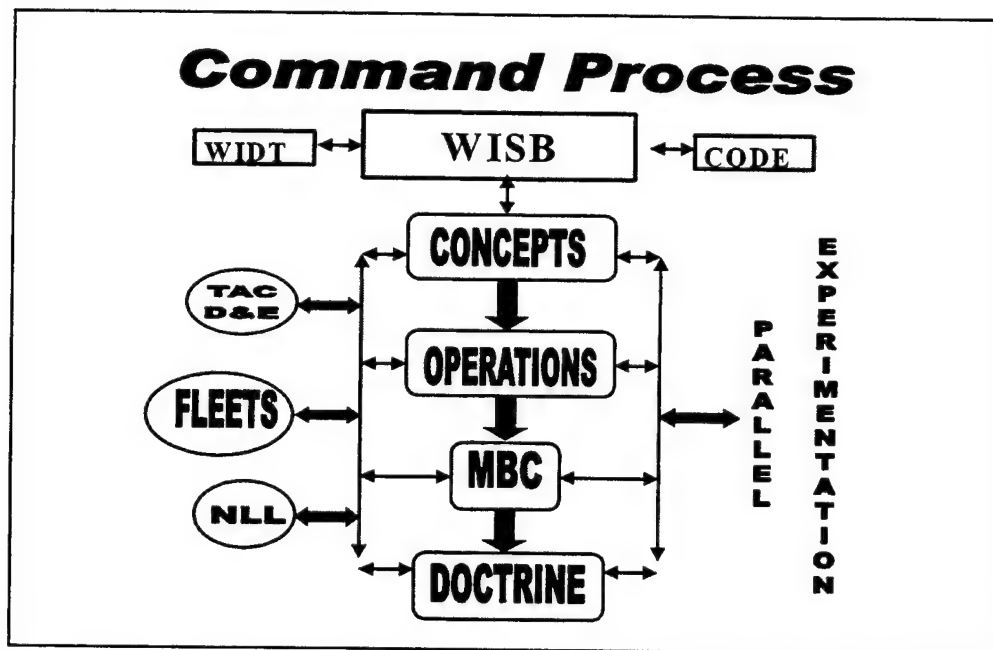
Figure 5. NWDC Command Process Diagram, from Ref. [20]

Figure 5 shows a representation of the NWDC command process. It shows how the CODE teams, WIDTs, and NWDC departments are directed by the WISB for the entire process. The left side of the diagram shows the fleet inputs to the process through the TAC D&E program, fleet commanders, and the Navy Lessons Learned System. The connecting arrows show how all departments should have involvement at every phase of the process.

3. Current Doctrine Department Organization and Process

The Doctrine department at NWDC has had to create a vision for its own process within the command process. Like the NWDC command process described earlier, it is in the first stages of implementation. The following description is a representation of

how the Doctrine department intends for the process to work. Many parts of this plan are in place and functioning, while others have yet to be implemented fully.

The final product of NWDC is intended to be "dynamically developed" doctrine. This dynamic development can only occur when the producers of doctrine know the needs of the users of doctrine. At NWDC, the Doctrine department acts as the mouthpiece, promulgating doctrine throughout the fleet. The Doctrine department also is the entity responsible for the maintenance of current doctrine. In fulfilling this latter function, the Doctrine department must have a mechanism in place for receiving feedback on the relevance of existing doctrine and the need for new doctrine. The primary means for feedback from doctrine users has been the normal review cycle for publications. This is essentially the same mechanism that has been in place for the last thirty years. The other method for input is the naval message format for urgent or routine changes, which was discussed earlier. A recent addition to the Doctrine department toolbox is the Navy Doctrine Working Party (NDWP). It has become the Doctrine department's primary means for the proposal, validation, and revision of Navy basic (strategic) and operational doctrine and Navy inputs into Joint doctrine [Ref. 21:p. 4]. The Doctrine department has created a doctrine development process centered around the NDWP and its other input mechanisms.

It is necessary to describe the NDWP further before delving into the process itself. The NDWP is a forum, which brings together a wide range of Navy organizations to discuss current doctrinal issues and act as full partners in the development of Navy doctrine [Ref. 21:p. 4]. The Executive Steering Committee of the NDWP is made up of

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representatives from Commander in Chief, U.S. Atlantic Fleet (CINCLANTFLT); Commander in Chief, U.S. Pacific Fleet (CINCPACFLT); Commander in Chief, U.S. Naval Forces Europe (CINCUSNAVEUR); Commander, U.S. Naval Forces Central Command (COMUSNAVCENT) and Commander Navy Warfare Development Command (Facilitator) as members [Ref. 22]. The Advisory Committee consists of representatives from Numbered Fleets, CARGRUs, DESGRUs, TYCOMs, OPNAV, PHIBGRUs, and Warfare Centers of Excellence [Ref. 22]. The NDWP is hosted twice annually by NWDC. The NDWP serves as the starting point for all development of new doctrine and a vast majority of the revision of current doctrine.
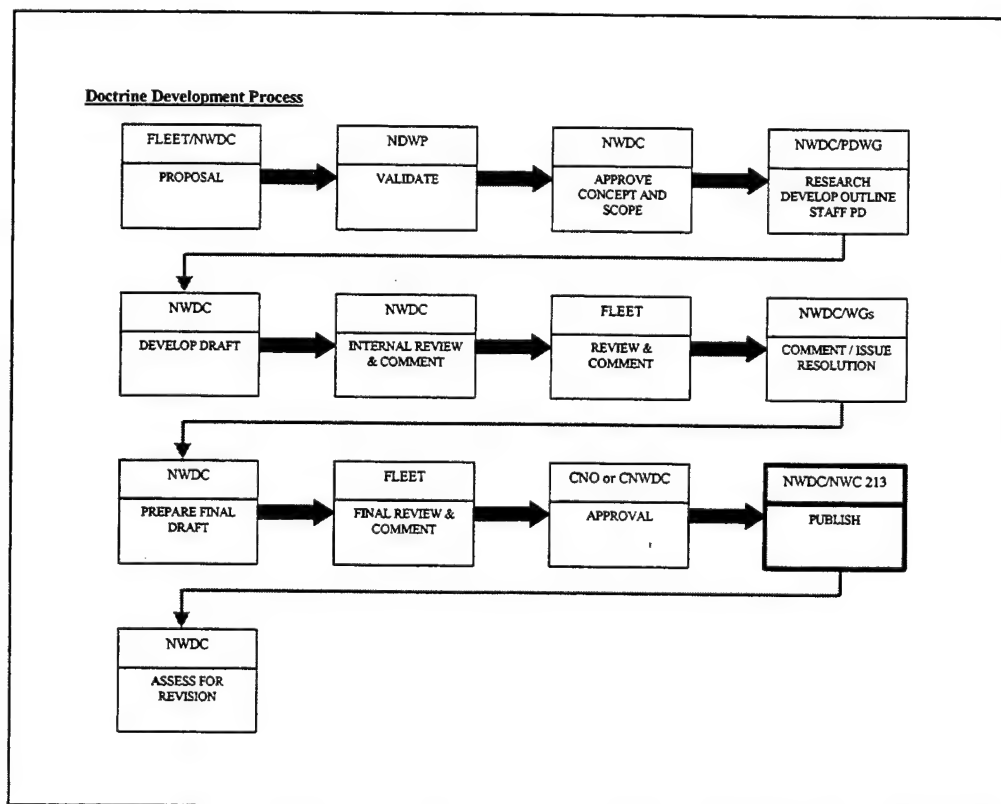

Figure 6. Doctrine Development Process Flowchart

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The doctrine development process consists of 13 steps. Figure 6 (Fig. 6) illustrates a flowchart of the process with the title of each step and the entity responsible for the completion of that step. Each of these steps will be described fully in the following paragraphs.

The first step in the process is the submission of a proposal to the NDWP for review. Proposals may be presented to the NDWP by a Navy major command, center of excellence, or senior leadership board [Ref. 21:p. 9]. The purpose of the proposal is to present a concept for a new doctrine document to the NDWP. As part of the proposal briefing, NWDC presents a front-end assessment of the proposal [Ref. 21:p. 9]. The proposal is evaluated according to three criteria: appropriateness, distinctiveness, and sufficiency [Ref. 21:p. 10]. Appropriateness means that the proposal was developed at the correct level of doctrine. Distinctiveness means that the proposal has a unique character not covered by existing doctrine. Sufficiency means that the proposal is supported by material and information. A proposal must address all of these requirements before being approved for development into doctrine [Ref. 21:p. 10].

The second step in the process is NDWP validation of the proposal. The NDWP acts as a corporate body to validate proposals for development of basic (strategic) and operational Navy doctrine documents [Ref. 21:p. 4]. The NDWP also decides if current doctrine publications should be revised [Ref. 21:p. 4]. The last function of the NDWP is to consolidate Navy positions on the different topics to be covered at the subsequent Joint Doctrine Working Party (JDWP) [Ref. 21:p. 4].

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The third step in the development process is the refinement of the concept and scope. NWDC will designate a PRA and CRAs to develop the proposed NWP [Ref. 21:p. 10]. The PRA is responsible for establishing milestones for developing, researching, and writing the doctrine [Ref. 21:p. 10]. The PRA works closely with the proposing office to determine the general scope and key elements of the proposal to be discussed in the next step of the process [Ref. 21:p. 11].

The fourth step in the process is researching and outlining and is conducted by the Program Directive Working Group (PDWG). The PDWG is a group of subject matter experts (SMEs) assembled by NWDC to develop a program directive and initial outline of a new NDWP [Ref. 21:p. 4]. The NWDC Action Officer (AO) reviews the doctrine proposal and NDWP approval to determine the general scope and direction of the document and conducts initial research on the topic in coordination with SMEs [Ref. 21:p. 11]. The AO then creates an initial outline that will be forwarded to members of the PDWG as read-ahead material for the PDWG meeting. During the PDWG meeting, significant milestones are discussed, the document outline is "fleshed-out," and chapters, key points, and main supporting topic sentences are generated [Ref. 21:p. 11]. Following the PDWG meeting, the AO disseminates the approved outline along with the planned milestones for the remainder of the development [Ref. 21:p. 11].

The fifth step in the process is the development of the draft publication by the PRA. The PRA bases the draft on the approved outline from the PDWG [Ref. 21:p. 11]. If necessary, the PRA may assign portions of the draft to be written by contractors or

members of the PDWG [Ref. 21:p. 11]. The primary consideration for this draft is content [Ref. 21:p. 11].

The sixth step in the process is the internal review and distribution for comment. NWDC staff conducts this step. The purpose of this step is to use the doctrine expertise that exists within NWDC to improve the NWP draft [Ref. 21:p. 12]. The focus of this review will be on readability, overall doctrinal tone, and consistency with already approved doctrine [Ref. 21:p. 12]. The NWDC AO for the NWP is to prepare a transmittal message for Commander, NWDC release tasking CINCs and COEs to review the doctrine and provide comments directly to the NWDC AO [Ref. 21:p. 12]. The draft publication is then either placed on the NWDC website with password protection or distributed by e-mail or fax to the designated reviewers [Ref. 21:p. 12].

The seventh step in the process consists of the review and comments. The purpose of this step is to give the draft publication the widest possible dissemination for review and comment [Ref. 21:p. 12]. NDWP members have 60 days to distribute each draft NWP through their organizations, have it reviewed, and consolidate comments in a line in-line out format [Ref. 21:p. 12]. The AO is to keep copies of all responses for records purposes [Ref. 21:p. 12].

The eighth step in the process is comment resolution. The AO is responsible for revising the NWP as necessary based on the inputs received [Ref. 21:p. 13]. The AO also is to resolve comments at the point of contact level, or if required, directly with the originator of the comment [Ref. 21:p. 10]. If the AO and commenting POC are unable to resolve issues, the disagreement is to be escalated up the chain of command [Ref. 21:p.

13]. All critical and major comments must be viewed by all voting members of the NDWP prior to beginning the preparation of the final product [Ref. 21:p. 13].

The ninth step in the process is designed to be the preparation of the final coordination draft. After the AO has incorporated or resolved all comments, the NWP is put into final draft format [Ref. 21:p. 13]. The Navy Terminologist conducts a formal terminology review of the publication [Ref. 21:p. 13]. Vignettes, pictures, and quotes are added to the publication to add relevance and readability [Ref. 21:p. 13]. After final editing, the document is closed to further changes [Ref. 21:p. 13].

The tenth step in the process is the final review and commenting. This step is similar to the initial review and comments in step seven. This review is only 30 days long vice the 60 in the initial review. Final received changes are incorporated and the document is sent to the Commander, NWDC (CNWDC)[Ref. 21:p. 13].

The eleventh step in the process is approval. For NDPs, the CNO is the approval authority. CNWDC is the approval authority for all other doctrine products [Ref. 21:p. 14].

The twelfth step in the doctrine development process is publishing. The NWDC publications manager converts the document into electronic file format (.pdf) for placement in the Navy Warfare Electronic Library (NWEL) for distribution via compact disk [Ref. 21:p. 14]. The publications manager also provides hard copies via the print on demand system [Ref. 21:p. 14]. The AO creates a record set to reflect the development history of the publication [Ref. 21:p. 14]. This record set will include: hard and electronic copies of the final publication, all versions of drafts formally staffed, all

significant comments received during coordination and resolution, any guidance issued during the publication development, and any other material deemed significant by the AO [Ref. 21:p. 14].

The thirteenth step in the process is the assessment for revision. This is an ongoing step during the life of a publication. The periodic review is the primary means of assessment and is conducted at the NDWP on an every other year basis [Ref. 21:p. 15]. AOs present briefings to the NDWP recommending major revision, minor revision, or no revision to the NWP [Ref. 21:p. 15]. The NDWP validates all proposals related to changes in doctrine [Ref. 21:p. 15]. A publication maybe recommended for an out-of-cycle review by the CNO, CNWDC, or NWDP members and is subject to and NDWP vote [Ref. 21:p. 15].

4.   Web-Enabled Doctrine

The doctrine process as it exists makes limited use of the functionality provided by information technology tools. To this point, the most extensive use of information technology has been in the area of dissemination. Draft publications are transferred by e-mail and made accessible via password-protected websites. The major method of distributing final doctrine products is via the NWEL CDs. These limited applications of information technology have increased the speed of draft reviews and product promulgation, but have not significantly affected the content of the product. NWDC's Doctrine department has implemented a new plan for Web-Enabled Doctrine that

incorporates the use of web-based doctrine development tools for the collection and evaluation of fleet inputs as well as the dissemination of products.

One of the prime motives for the Web-Enabled Doctrine plan is to increase fleet participation in the doctrine process. In the past, Fleet participation has been limited by several factors. The process was timeline driven, resulting in cyclical opportunities to participate. The cyclical process often failed to intersect with the operational cycles of much of the Fleet. The process was a low-visibility, behind-the-scenes type of undertaking. The Fleet was not familiar with the process and the need for its participation. In this system, doctrine grew stagnant. To alleviate these problems, the Web-Enabled Doctrine initiative incorporates the use of the web-based newsgroup model in the doctrine process.

The application of this model has the potential for many benefits for the doctrine development process. Web access allows a far larger audience to participate in the process [Ref. 23]. The ability for constant review through web access unties the process from the timeline and rigid schedules [Ref. 23]. Operators can "strike while the iron is hot" rather than having to wait for the formal review procedures. Web access allows for higher visibility of the process throughout the fleet [Ref. 23]. The reduction in paperwork and administrative burden encourages participation in the process [Ref. 23]. The newsgroup format allows a forum for open discussions that may stimulate dialog and serve as a breeding ground for new concept innovation [Ref. 23]. The newsgroup model provides a subscription function that notifies key individuals of comments or suggestions regarding certain issues, thus creating a "community of practice [Ref. 23]." The

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overarching benefit of this tool is that it increases Fleet awareness and ownership of Navy doctrine.

The initial stages of this plan have already begun. In August 2000, CNWDC described his vision for the Web-Enabled Doctrine initiative to the Doctrine department at NWDC. Within three days, the prototype system had been designed and a working model was created. The beta system consisted of a Microsoft Access97 database with a Cold Fusion interface. It was populated with seven publications (newsgroups) for testing. The system was demonstrated to CNWDC, who then briefed the CNO on the plan at the end of August. In September 2000, the system was briefed and demonstrated to the NDWP. NDWP approved the plan and a timeline for the implementation of Web-Enabled Doctrine. By November 1, 2000, database population for the test site was completed and associated newsgroups were created. The test site now contained 390 doctrine and TTP publications (in .pdf format) ready for review. A week later, the website was placed online for an initial testing period. Due to Navy policy, access to doctrinal publications is only allowable through a SIPRNET connection. A message was sent to NDWP members, requesting review and comments on the system. Testing and review continued for two months. In January 2001, NDWP responses were incorporated into the system, with some improvements ongoing. System IOC was reached on February 6, 2001, and a Navy-wide message was issued, announcing the first implementation of Web-Enabled Doctrine. On that same day, the first Fleet response was received via the website.

It would seem that Web-Enabled Doctrine can be plugged directly into the existing process to reduce the timeline and widen the audience for review of publications. There are certain steps of the doctrine development process that easily can incorporate web-based tools. NWDC's Doctrine department has recognized this and modified the doctrine development process to incorporate the new tools. The sixth step in the process, internal review and distribution, can utilize the web to allow the necessary personnel access to conduct their review and see other individuals' inputs. This situation could produce a brainstorming effect of building upon ideas and improving the content. The seventh step in the process, initial review and comments, can use Web-Enabled to doctrine to quickly disseminate draft material by making it accessible via the website. The newsgroup function could produce the same effect as in the previous step, but on a wider scale. The eighth step in the process, resolution of comments, can utilize the newsgroup function to facilitate discussions on the validity of comments, leading to quicker resolutions of these issues. Web-Enabled Doctrine can facilitate the tenth step in the process, final review and comments, much in the same way as steps six and seven. The twelfth step in the process, doctrine publication, is made much more responsive than the NWEL CD distribution. New doctrinal or TTP publications can be posted in Web-Enabled Doctrine as soon as they are approved, rather than waiting for the next NWEL CD distribution. This ensures that the Fleet has access to the most up-to-date versions of publications. The thirteenth step in the process, continuing assessment and review, is greatly enhanced by the use of Web-Enabled Doctrine. The Fleet no longer has to wait for the next review cycle or submit naval messages to address issues in doctrinal

publications. Input can be submitted immediately to a publication's PRA from any sailor with access to the Web-Enabled Doctrine tools. Inputs may represent an individual's views on an issue, or it may represent a command position. Either way, the new tool provides a significant voice for the Fleet with respect to the doctrine process.

There are some technical aspects of the Web-Enabled Doctrine system that require further discussion. As stated before, all publication files are stored in .pdf format, which is readable primarily with Adobe Acrobat Reader. These data files, depending on the length of the publication and the method used for conversion to .pdf format, range in size from approximately 100 kilobytes to 15 megabytes. Many of the older, hard copy only publications had to be entered into digital format using optical scanners. This resulted in some of the larger file sizes. Publications that already existed in another electronic format could be converted into relatively small .pdf files. Due to bandwidth restrictions, the larger files are mainly inaccessible to ships at sea. Also mentioned briefly was the fact that the Web-Enabled Doctrine website is only accessible via SIPRNET. Many commands have limited SIPRNET access. These units are virtually cut off from the new system and must rely on the older, slower mechanisms for input. The problems of file size and SIPRNET only access are significant detractors from the system's accessibility.

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IV. ANALYSIS OF WEB-ENABLED DOCTRINE

A. WEB-ENABLED DOCTRINE AND THE WEB-BASED NAVY

In December 2000, the Vice Chief of Naval Operations, Admiral W.J. Fallon, chartered "Task Force Whiskey (TFW)", a working group composed of naval leaders and information technology experts, to develop an enterprise-wide information systems architecture for the Navy [Ref. 24:p. 3]. Previous implementations of information technology in the Navy resulted in a myriad of separate, non-interoperable databases and the lack of effective means to exchange information. Task Force Whiskey's goal was to develop a vision and overall plan to take advantage of web technologies to create an integrated architecture for information exchange in the Navy. TFW generated guidelines for an operational information systems architecture titled the Web-Based Navy (WBN). NWDC is tasked with tailoring Web-Enabled Doctrine tools to fit this proposed architecture. It is necessary to analyze the current Web-Enabled Doctrine implementation with respect to its degree of compliance with the proposed enterprise-wide architecture. This analysis will provide a roadmap to future implementations of Web-Enabled Doctrine.

1. Web-Based Navy Architecture

It is necessary to further describe the Web-Based Navy Architecture before conducting an analysis of Web-Enabled Doctrine. It is important to note that the WBN is

still in the conceptual stages. With this in mind, the following description of the WBN presents a conceptual vision of how the system should perform and some of the emerging technologies that might bring these ideas into implementation.

One of the key requirements for the WBN philosophy the ability to aggregate data from disparate enterprise-wide knowledge bases into information specific to the user's needs [Ref. 24:p. 5]. There are several characteristics of the web-based architecture that ensure this seamless operation. Databases will be decoupled from specific applications required to access them [Ref. 24:p. 5]. Portals will be the fundamental means by which information is accessed. All naval personnel will have access to a customizable portal that presents information relevant to them [Ref. 24:p. 5]. The portals also will provide access to work flow management capabilities such as training and maintenance management [Ref. 24:p. 5]. Emerging commercial standards for Web interoperability will be used to ensure data are "self-describing [Ref. 24:p. 5]." Data will be represented in a form that describes its content rather than the format in which it is displayed. The last characteristic of the WBN is the implementation of Information Control (INFOCON) policies and configurations for authorized commanders to establish and control [Ref. 24:p. 6]. The INFOCON program is analogous to the Navy Emission Control (EMCON) program for electromagnetic transmissions.

WBN architecture relies heavily on the implementation of a three-tier information systems architecture [Ref. 24:p. 15]. This three-tier architecture consists of a presentation/client tier, an application tier, and a data/content tier [Ref. 24:p. 15]. The three tiers, with information assurance and inter-tier infrastructure, spanning all tiers,

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interact to provide a single, common set of web-services to the user [Ref. 24:p. 15]. The presentation/client tier is represented in the WBN by the various user portals [Ref. 24:p. 16]. These portals may be accessed via desktop or laptop computers, personal digital assistants (PDAs), or any other device with web access. The application tier is represented in the WBN by application servers [Ref. 24:p. 17]. In the WBN, a shore station may access applications at a geographically distant server, but an afloat unit may have local servers that provide local authentication, faster logon, and application use when connectivity is not available [Ref. 24:p. 17]. The data/content tier for the WBN consists of authoritative data centers located at the Naval Computer and Telecommunications Area Master Stations (NCTAMS) for each area of responsibility (Pacific, Atlantic, European, and Central) [Ref. 24:p. 19]. The data will be replicated at each of the NCTAMS [Ref. 24:p. 19]. Business process owners will maintain their respective databases and update the authoritative data centers' database [Ref. 24:p. 19]. Some of these business process databases will be partially replicated and placed locally at afloat units as necessary [Ref. 24:p. 19]. The operational advantages of this type of data system are: global redundancy of data, elimination of unsynchronized data centers, automated load balancing at replicated data centers that increases the ease of access, improved security as a result of the global implementation of standard firewall configurations, the timely access of relevant authoritative mission critical data, ease of coordination with afloat unit operation centers for smart database replication and updates, and the avoidance of over saturation of single authoritative data sites [Ref. 24:p. 19].

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The key enabling technology for the implementation of the Web-Based Navy architecture is the development of "self-defining data." The computing model that has existed for decades ties data to specific functions and applications. The result of this model was the redundant storage of data in countless incompatible formats. The proliferation of the Internet during the 1990s necessitated the development of data formats that were usable by several different applications on various types of operating systems and computer hardware. The Hyper-Text Markup Language (HTML) document was developed to fill this need. However, HTML only describes a common presentation for data. Data could not be manipulated using an HTML document. An emerging Web standard, eXtensible Markup Language (XML) provides the functionality that is necessary for the creation of "self-defining data." XML separates the definition, transmission, validation, and interpretation of data between applications from the display of the data through the use of designer specified data tags. These tags describe the content of the data rather than the presentation. Data in XML format is self-sufficient. It has meaning without being parsed by any application. This allows it to be used by any web-based application with access to the data-type dictionary.

2.   Web Enabled-Doctrine Architecture Comparison

NWDC's implementation of Web-Enabled Doctrine began in August 2000, while Task Force Whiskey did not even exist until December 2000. Because of this, it is not surprising that some disparities exist between the current implementation of Web-Enabled Doctrine and the WBN architecture. These differences are easily excusable, but

they must be addressed if the system is to mature and become a functioning part of the WBN.

The primary obstacle in gaining Web-Enabled Doctrine compliance with WBN principles is the existing database. As mentioned in Chapter III, the primary tool for Web-Enabled Doctrine is a Microsoft Access97 database with a Cold Fusion web-application server interface. Files are stored in the .pdf format only. The .pdf format was chosen mainly as a matter of convenience and to facilitate the fastest implementation of the system. These files are only accessible using the Adobe Acrobat Reader or compatible software. There is no capability to conduct a keyword search of documents in the database. Most of the .pdf files are too large to be transferred in a timely manner via the bandwidth available to the Fleet. Because the files are stored in this format, conversion to XML format is going to be an enormous undertaking. As daunting as the task may seem, it is absolutely necessary for compatibility within the WBN.

The architecture of the Web-Enabled Doctrine system incorporates a basic implementation of the multiple-tier architecture. The Cold Fusion interface is an application service provider software that functions the same as an application server in the second tier of the three-tier architecture. This interface accesses the database through the Cold Fusion Markup Language, which is similar in format to HTML and XML. The main drawback of the Cold Fusion interface is that it is designed to interact with specific database products, such as Microsoft Access or Oracle. This is more a function of the existing database than a lack of capability in the software. Future versions of the software are likely to incorporate XML to increase the functionality of the interface.

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Web-Enabled Doctrine departs significantly from the WBN architecture in the area of accessibility. The main obstacle to accessibility is the policy requirement that forces the website to be accessible via SIPRNET only. The Navy has yet to migrate towards the Private Key Infrastructure called for in the WBN architecture. As a result, the most extreme security measures are taken to prevent unauthorized access to doctrinal publications. SIPRNET access is difficult to come by in the Fleet. Access to SIPRNET terminals, when they exist, is severely restricted. Much of the Fleet is unable to reach the Web-Enabled Doctrine. This is in direct contrast with the assured access that is to span all levels of architecture in the WBN.

B.   THE FUTURE OF WEB-ENABLED DOCTRINE

Fortunately, key personnel at NWDC have recognized the issues discussed in the previous section. NWDC has developed a vision for the future of Web-Enabled Doctrine that incorporates the principles of the WBN architecture. There are obstacles to the implementation of this vision in the areas of manpower, policy, and technology. The policy problem has been discussed earlier with respect to system accessibility. This section will describe the functionality of the proposed system as well as the remaining obstacles related to manpower and technology.

The Web-Enabled Doctrine of the future is often referred to as "user-defined doctrine." In this system, a user can access the doctrine database using the three-tiered architecture of the WBN. Once the database is accessed, the user can conduct publication searches based on key words or phrases. The user will be able to enter a task or a

combination of tasks and the system will query the database and return results to the user that conform to their request. The future database will include the doctrinal publications, Fleet comments on those publications, and Navy Lessons Learned data. The system can present as much or as little of this related data as requested by the user. For example, if a user enters the key phrases "LCAC Operations" and "LPD-17", the system will provide the relevant doctrinal and TTP publications, Fleet comments on the publications, and lessons learned data relating to operating LCACs (Landing Craft Air Cushion) from an LPD-17 class ship. The user can restrict the data request to publication or lessons learned data only. The user defines their doctrinal needs, and the system provides the product. The ultimate incarnation of the system will depart totally from the current paradigm of separate publications and exist as a single doctrine source.

There are current efforts at NWDC to plan for the database migration from .pdf files to XML formatted data. The first problem encountered by these efforts is the mountain of data reentry and reformatting that must be accomplished. Another significant concern is the creation of a common data dictionary by which all data in the WBN are defined. One solution to this problem is a proposal to use the Navy Mission Essential Tasks Lists (NMETL) as a basis for the data type dictionary. Naval tasks support every level of war: strategic, operational and tactical. These tasks are developed directly from doctrine and TTP. The NMETL is an extant system that has broken doctrine down to the task level. To facilitate a searchable doctrine database, the task level of doctrine has been determined as the appropriate level at which to store data. At this level, doctrine is broken down to its smallest stand-alone components. These

components can be combined with other doctrine components to synthesize "user-defined doctrine." The database can be created using NMETL as the basisi for XML data tags to define the data.

V. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

The primary focus of this study was to determine whether or not the Navy has created a more dynamic development process for doctrine with Web-Enabled Doctrine. A comparison of today's doctrine process to past doctrine processes in the Navy reveals significant advances towards this goal. There are some aspects of today's doctrine process that very closely resemble a dynamic process, but there are other aspects where there is still progress to be made.

The well-defined doctrine development process that exists within the Doctrine department at NWDC is one of the brightest points in this study. The first step in process improvement is outlining and describing the steps of the process. This acts as the starting point for analysis of the process and the identification of areas for improvement. Having taken this step, the Doctrine department has set the machinery of change in motion.

Another positive indicator of a dynamic process is the identification in the NWDC command process of the need for inter-departmental cooperation. Current leadership at NWDC is fostering such interaction. The establishment of the WISB, WIDTs, and CODE teams provide important mechanisms for developing synergistic relationships between departments that must exist in a dynamic process.

The Navy Doctrine Working Party is another important component in the dynamic development process. The NDWP involves operational and developmental Navy leaders

together in frank doctrinal discussions. These individuals must sell doctrine to the fleets. There must, of course, be top-level buy in at the highest levels of the Navy, but it is the operational commander that must indoctrinate his forces. The voice that these leaders gain through the NDWP increases their ownership stake and level of trust in doctrine. When these leaders believe in the doctrine they have helped to create, they will sell it to their sailors.

The concept of Web-Enabled Doctrine represents a fundamental change in the doctrine development process and a marked shift towards the creation of a dynamic development process. Never in the history of the Navy has the Fleet had such a voice in the doctrine process. The naval messages and periodic reviews of the past were inadequate methods of receiving timely input from the fleet. If sailors had a comment to make on a doctrinal or tactical publication, they were forced to generate official correspondence and run it through their chain of command. This administrative burden stifled much input. Web-Enabled Doctrine allows sailors a constantly available, real time method for making doctrinal inputs. This allows for current issues to be addressed and increases Fleet ownership of doctrine.

The one area that hinders the process is accessibility. As discussed before, a large portion of the fleet is unable to access the Web-Enabled Doctrine due to the SIPRNET only access. This situation, if not rectified, could lead to disenfranchisement and a lack of interest in the doctrine process. All operational commands need assured access to this system if it is to reach its full potential as a means of collection and dissemination for doctrine development.

B.   RECOMMENDATIONS

The doctrine development process is in the process of becoming a more dynamic undertaking. As a result, there are few recommendations that can be made along these lines. Many of the key issues for process improvement have already been identified, but bear repeating at this time.

The quick implementation of Web-Enabled Doctrine provided a basic capability for web-accessible doctrine. This capability must be expanded in accordance with the Web-Based Navy architecture. The migration of the NWEL database from .pdf data format to XML formatted data should be accomplished expeditiously. The NMETL system provides a baseline for the construction the data type dictionary necessary for the database migration and should be employed in that manner. The new NWEL databases should be maintained at the authoritative data centers with remote databases located aboard afloat units. The databases aboard afloat units can be updated during times of low bandwidth use.

The use of application servers and application service providing software should continue. Similar to the databases, scaled-down application servers should be placed aboard afloat units to provide application functionality when connectivity is not available. The employment of XML and the three-tiered architecture will improve access to the most current publications at all units.

The final recommendation for the Navy's doctrine process is that it be marketed extensively. The Fleet must be involved in the development process and must have

access to the final products of the process. The only way that this will occur is if the sailors at sea know about the system. A single message announcing the activation of the system does not provide enough visibility. Awareness of the system and the doctrine process must be increased Navy-wide. A series of articles in warfare community and service magazines along with continued message traffic could provide the necessary exposure.

C. SUGGESTED FURTHER STUDIES

This study provides a broad-brush approach to the topic of doctrine in the Navy. As a result, there are several areas of this study that lend themselves to expansion for further studies. Some of these areas are discussed below.

Web-Enabled Doctrine is a very new system. It has been online for less than two months. Very little data has been collected on exactly how much it is being used by the fleet. The system has yet to be incorporated into an NDWP meeting cycle. Much study is required to see how it is affecting the process.

The migration of Web-Enabled Doctrine databases is an enormous undertaking. The creation of data type dictionaries for the new XML databases is a key issue. A feasibility study on the use of NMETLs for this purpose is appropriate.

Another area that requires study is in assessing the fleet's use of doctrine. A survey type study of the Fleet, education centers, and centers of excellence could be conducted to determine where doctrine is employed the most and by which method it is

accessed (hard copy publications, NWEL CDs, web). The survey could also determine which levels of doctrine are accessed and used the most (basic, operational, tactical).

This study touched very lightly on the organization of NWDC and its Doctrine department. An organizational analysis of NWDC and each of its component departments could provide unique insight into the command and its processes. A task/organization analysis could be conducted to determine whether the current structure of NWDC is the best for the doctrine process.

These areas represent only a few of the avenues for study in Navy doctrine. It has been a topic long taken for granted in the Navy. Increased study of the topic can only lead to a better understanding and better implementation of doctrine in the Navy.

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APPENDIX

The following list of questions was utilized as a basis for the semi-structured interviews conducted with former and current NWDC personnel to gather information on the doctrine development process. This list does not include all questions asked. Additional questions were asked to clarify answers and explore issues at a deeper level of detail.

Interview Script:

Good Morning/Afternoon, I'm LT Joe Fauth. I am currently an Information Technology Management graduate student at the Naval Postgraduate School in Monterey. The purpose of this interview is to gather information for my thesis on The Web-Based Doctrine Development Tool: A Step in the Evolution of Dynamic Doctrine.

This research will focus on the history of the naval doctrine process, its current state, and how the WBDDT could affect the process.

I will be taping the interview so that I can accurately record your answers for use in the research. If at any time you do not want to answer a question or want to go off the record feel free to stop the cassette. The interview should last between 45-60 minutes. Before we begin, do you have any questions for me?

Introductory Questions

- Position/Job Title?

- Time in Position?

- Tasks that you are responsible for?

- Any special background info on yourself?

- What are some key events that you feel have impacted your position/department at NWDC, and what was the impact?

Doctrine Definition and History

- How do you define doctrine?

- How do you describe the line between doctrine and TTP?

- How do you define dynamic doctrine?

- What is your perspective of the history of naval doctrine?

- What role has history and tradition played in shaping today's doctrine process?

- Are you familiar with the circumstances surrounding the establishment of NDC? If so, what is your perspective on those circumstances? Its organization? Its processes?

- Are you familiar with the circumstances surrounding the establishment of NWDC? If so, what is your perspective on them?

- What is you understanding of NWDC's mission and purpose?

- What final products come out of NWDC?

- Who are NWDC's customers, specifically?

Organization

- Who are the key stakeholders/actors/groups involved with NWDC?

- How do they interact with NWDC ? Which have the biggest impact?

- Are there any conflicts between the key stakeholders' expectations and the products delivered by NWDC?

- Describe the shape/structure of the organization at NWDC.

- Which parts of the organization are involved in the doctrine development/review process?

- How closely is reviewing old doctrine related to generating new doctrine?

- Is there any mechanism currently in place for fleet input on doctrine issues? How closely is NLLS related to the process?

- Ideally, where should the input come from?

- Describe the doctrine process flow.

- What Procedural/Physical/Personal obstacles hinder this flow?

- Do you have the tools available to accomplish the tasks that are required?

- Do you have the manpower available to accomplish the tasks that are required? IT personnel for WBDDT?

- What part of the process works best?

- What would you change about the process?

- Tell me a doctrine process success story. Why was it a success?

- Tell me a doctrine process failure story. Why was it a failure?

Web-Based Doctrine Development Tool

- What is the envisioned function of the WBDDT?

- Can you give a brief technical description of the WBDDT? Software? Hardware? Network architecture?

- Are there any technical problems that might hinder the WBDDT's functionality?

- Are there accessibility problems?

- Where does the WBDDT fit in the current process?

- Do you think the process will change as a result of implementing the WBDDT? If so, in what way?

Wrap-Up Questions

- Now that you have a better idea of what I am looking for, are there any questions that I should have asked, but did not?

- Do you know of anyone not on my interview list that I should talk with?

- Are there any publications, manuals, articles, instructions that I should read to gain a better understanding of anything we have discussed today?

- Is there anything that you would like to clarify or add?

- Thank you for your time. If I need to call you at a later date to fill in some more information is that okay and what is the best way to contact you?

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